AUTOMOTIVE INDUSTRIES

AUTOMOTIVE and AVIATION MANUFACTURING
ENGINEERING • PRODUCTION • MANAGEMENT

SEPTEMBER 1, 1955

MACHINE TOOL AND PRODUCTION EQUIPMENT ISSUE

MAKING INDUSTRIAL AMERICA STRONGER.....Pages 77-110

- MACHINE TOOL SHOW PREVIEW.....Pages 111-208
- PRODUCTION ENGINEERING SHOW PREVIEW..Pages 209-226
- COLISEUM MACHINERY SHOW PREVIEW.....Pages 227-233

All-New Lincoln for 1956

COMPLETE TABLE OF CONTENTS, PAGE 3

A CHILTON PUBLICATION

STANOIL
INDUSTRIAL OIL

does heavy chores for
Light Metals Corporation

Tool Room Superintendent Max Chase (left) and Production Engineer Peter Van Dyke (right) with Standard lubrication specialist R. T. Cleland inspect frame of extruded aluminum. Bob Cleland, a graduate of Michigan State with a B.S. in Mechanical Engineering and of Standard's Sales Engineering School, has the background to provide customers with competent technical service on their lubrication problems. This training and experience, customers have found, pay off for them.

Light Metals Corporation uses this 1,250 ton Hydropress for extrusion of aluminum shapes for aircraft, automotive and major appliance industries. Press operates at 2,840 psi in the hydraulic system. Hydraulic medium is STANOIL.

WAVY

Three years ago [illegible] 1,250 ton Hydrop[illegible] system was STANO[illegible] since its start up. There is no evidence of deposits or varnish anywhere in the hydraulic system. Light Metals Corporation looks forward to many more years of such trouble-free operation.

Why was STANOIL ordered by Light Metals for their Hydropress? The answer is found in the service STANOIL has given in other equipment. Back in 1948 when a Watson-Stillman extrusion press went into operation for Light Metals, STANOIL was chosen as the hydraulic oil. As with the Hydropress, STANOIL has a perfect performance record. The Watson-Stillman press has operated seven years without shutdown because of hydraulic fluid failure.

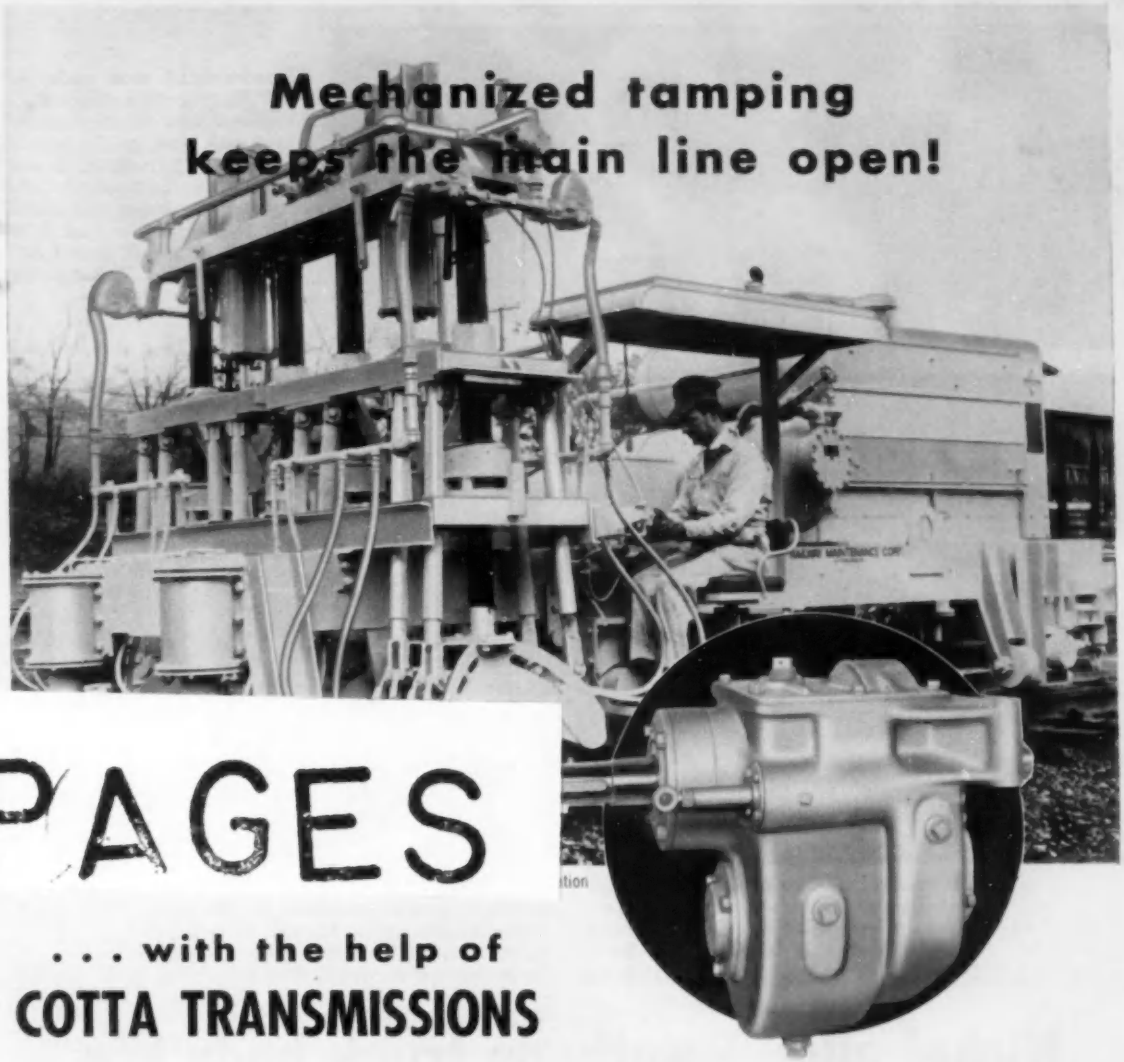
This kind of service from a hydraulic oil means Light Metals Corporation can turn out extruded aluminum shapes for the aircraft, automotive and major appliance industries with high performance and low maintenance factors that mean bigger profits. Reason enough for relying on STANOIL.

STANOIL Industrial Oil can perform for you just as it is doing for Light Metals Corporation. In the Midwest a lubrication specialist from your nearby Standard Oil office will explain how. Call him. Or contact Standard Oil Company, 910 S. Michigan Avenue, Chicago 80, Illinois.

STANDARD OIL COMPANY
(Indiana)

STANDARD

Mechanized tamping keeps the main line open!



PAGES

. . . with the help of COTTA TRANSMISSIONS

• Dependable operation of mobile maintenance machinery prevents interference with main line traffic.

That's why Railway Maintenance Corporation, Pittsburgh, Pa., provides added protection to users of its fast and versatile *McWilliams Tie Tamper* with Cotta Heavy-Duty Transmissions. Built for continuous, heavy-duty operation . . . in every climate and weather . . . the Cotta Transmission will give trouble-free service throughout the life of the Tie Tamper.

If ordinary gear boxes are too light for your job, Cotta can give you a standard transmission, with multi-speeds forward and reverse, or a low-cost, customed-design unit that fits your available space exactly.

And, for use with torque converters on trucks, rail cars, and other equipment requiring easier control of power through a wide range of torque and speed conditions, Cotta designs transmissions that combine "top" performance, low first cost . . . and low maintenance!

Thousands in operation throughout the United States and foreign countries . . . on a variety of tough construction and maintenance jobs . . . you can't go wrong when you specify Cotta! Input torques from 150 to 2500 ft. lbs.

THIS INFORMATION WILL HELP YOU

Diagrams, capacity tables, dimensions, and complete specifications sent free on request. Just state your problem—COTTA engineers will help you select the right unit for best performance. May we work with you?

COTTA TRANSMISSION CO., ROCKFORD, ILLINOIS

An Assurance of Dependable Service

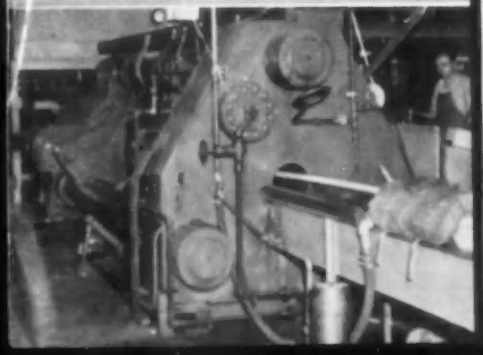
COTTA
HEAVY-DUTY TRANSMISSIONS
"Engineered-to-order"

STANOIL
INDUSTRIAL OIL

does heavy chores for
Light Metals Corporation

Tool Room Superintendent Max Chase (left) and Production Engineer Peter Van Dyke (right) with Standard lubrication specialist R. T. Cleland inspect frame of extruded aluminum. Bob Cleland, a graduate of Michigan State with a B.S. in Mechanical Engineering and of Standard's Sales Engineering School, has the background to provide customers with competent technical service on their lubrication problems. This training and experience, customers have found, pay off for them.

Light Metals Corporation uses this 1,250 ton Hydropress for extrusion of aluminum shapes for aircraft, automotive and major appliance industries. Press operates at 2,840 psi in the hydraulic system. Hydraulic medium is STANOIL.



Three years ago Light Metals Corporation, Grand Rapids, put their 1,250 ton Hydropress into operation. The initial fill for the hydraulic system was STANOIL Industrial Oil. The press has operated continuously since its start up. There is no evidence of deposits or varnish anywhere in the hydraulic system. Light Metals Corporation looks forward to many more years of such trouble-free operation.

Why was STANOIL ordered by Light Metals for their Hydropress? The answer is found in the service STANOIL has given in other equipment. Back in 1948 when a Watson-Stillman extrusion press went into operation for Light Metals, STANOIL was chosen as the hydraulic oil. As with the Hydropress, STANOIL has a perfect performance record. The Watson-Stillman press has operated seven years without shutdown because of hydraulic fluid failure.

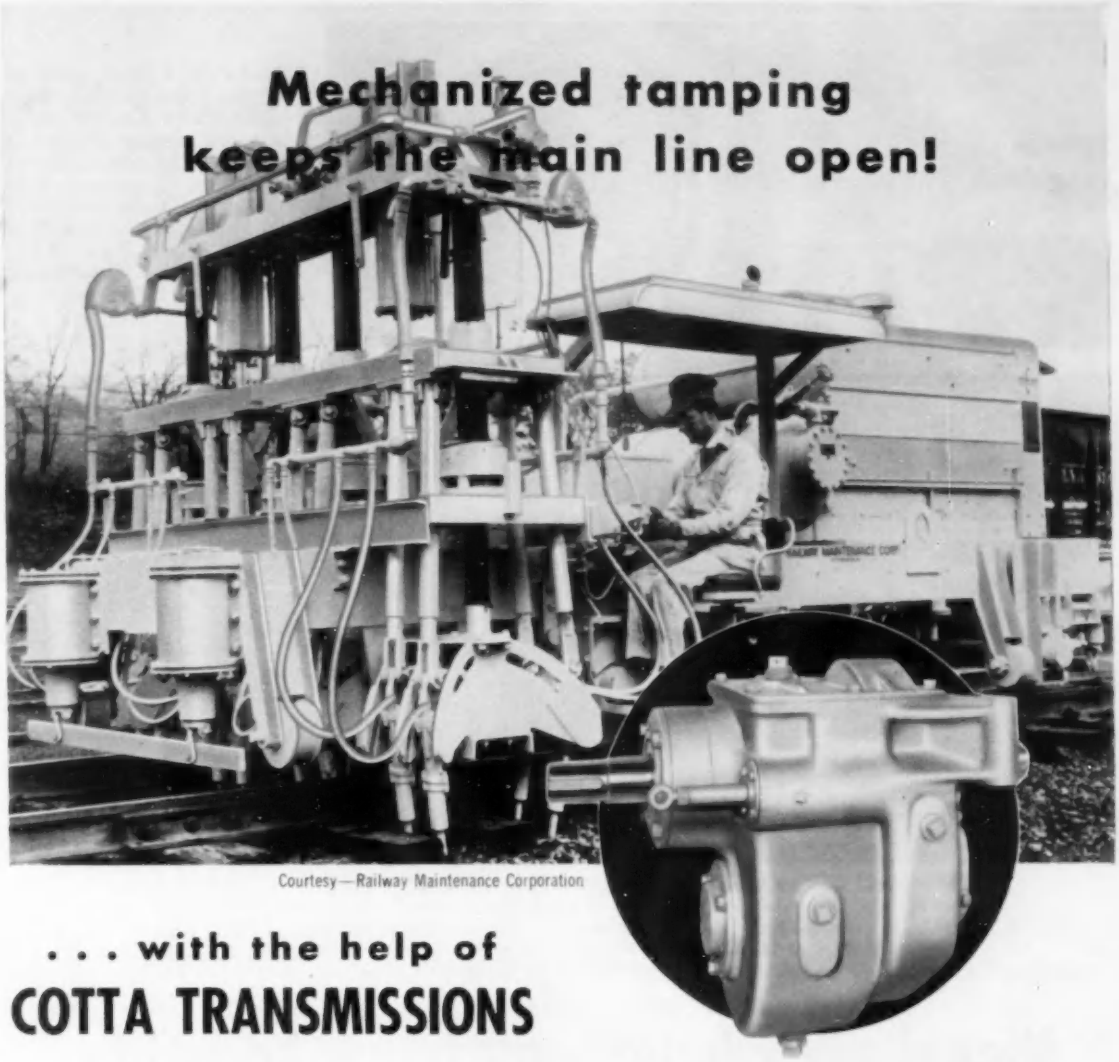
This kind of service from a hydraulic oil means Light Metals Corporation can turn out extruded aluminum shapes for the aircraft, automotive and major appliance industries with high performance and low maintenance factors that mean bigger profits. Reason enough for relying on STANOIL.

STANOIL Industrial Oil can perform for you just as it is doing for Light Metals Corporation. In the Midwest a lubrication specialist from your nearby Standard Oil office will explain how. Call him. Or contact Standard Oil Company, 910 S. Michigan Avenue, Chicago 80, Illinois.

STANDARD OIL COMPANY
(Indiana)

STANDARD

Mechanized tamping keeps the main line open!



Courtesy—Railway Maintenance Corporation

. . . with the help of COTTA TRANSMISSIONS

• Dependable operation of mobile maintenance machinery prevents interference with main line traffic.

That's why Railway Maintenance Corporation, Pittsburgh, Pa., provides added protection to users of its fast and versatile *McWilliams Tie Tamper* with Cotta Heavy-Duty Transmissions. Built for continuous, heavy-duty operation . . . in every climate and weather . . . the Cotta Transmission will give trouble-free service throughout the life of the Tie Tamper.

If ordinary gear boxes are too light for your job, Cotta can give you a standard transmission, with multi-speeds forward and reverse, or a low-cost, customed-design unit that fits your available space exactly.

And, for use with torque converters on trucks, rail cars, and other equipment requiring easier control of power through a wide range of torque and speed conditions, Cotta designs transmissions that combine "top" performance, low first cost . . . and low maintenance!

Thousands in operation throughout the United States and foreign countries . . . on a variety of tough construction and maintenance jobs . . . you can't go wrong when you specify Cotta! Input torques from 150 to 2500 ft. lbs.

THIS INFORMATION WILL HELP YOU

Diagrams, capacity tables, dimensions, and complete specifications sent free on request. Just state your problem—COTTA engineers will help you select the right unit for best performance. May we work with you?

COTTA TRANSMISSION CO., ROCKFORD, ILLINOIS

An Assurance of Dependable Service

COTTA
HEAVY-DUTY TRANSMISSIONS
"Engineered-to-order"

Deadweight was reduced 600 lbs. in the shell of this metropolitan delivery truck-tank unit through the use of Mayari R. The tank, which was built for an oil company in California by the Independent Iron Works, Oakland, was made of 12-gage Mayari R sheets and weighs 3200 lbs. The capacity of the tank is 2200 gal.

This fleet of 2-ton trucks holds down both operating and maintenance expenses, thanks to reduced deadweight in bodies built of Mayari R by Leonhardt Body Division of Charles T. Brandt, Inc., Baltimore, Md. Furthermore, life of truck bodies is greatly extended by the corrosion-resistance of Mayari R, a high strength, low alloy nickel steel, produced by Bethlehem Steel Co., Bethlehem, Pa.

Nickel alloy lengthens truck body life ...allows 15% weight reduction

These truck bodies are made from Mayari R...a high strength, low alloy steel containing nickel.

Its use in these bodies enabled the builder to cut deadweight approximately 15 per cent. Because thin, light sections of this type steel provide the same strength as thicker, heavier sections of plain carbon steel.

What's more, Mayari R and similar high strength, low alloy nickel steels offer 5 to 6 times the corrosion resistance of carbon steel in atmosphere. And 2 to 4 times that of copper bearing steel.

As a result, these steels retain most of their original section thickness and hence their original strength during years of use. This means less maintenance ... and greatly lengthened equipment life. Their resistance to impact and abrasion is also superior to that of carbon steels.

Get the facts ... send for a copy of "Nickel-Copper High-Strength Low-Alloy Steels." Cover-to-cover, it's full of valuable data. It tells you how these nickel steels perform on a variety of jobs... their response to fabrication ... and design factors that can help you cut deadweight. Write for your copy now and learn how these steels can save you money.

INCO **THE INTERNATIONAL NICKEL COMPANY, INC.** 67 Wall Street New York 5, N.Y.

AUTOMOTIVE INDUSTRIES

A CHILTON MAGAZINE — PUBLISHED SEMI-MONTHLY

SEPTEMBER 1, 1955 — VOL. 113, NO. 5

MACHINE TOOL AND PRODUCTION EQUIPMENT SECTIONS

MAKING INDUSTRIAL AMERICA STRONGER..... 77
Stronger Industrial America. By J. R. Custer.... 79
Coordination in Developing Machine Tools, Other Production Equipment. By Joseph Geschelin.. 81
100 Years of Progress in Development of American Metalworking Equipment. By Guy Hubbard 84
Machine Tool Productivity. By Thomas Mac New. 88
Automation News Report. By Paul Kennedy..... 90
Metals Market Report. By William F. Boericke.. 92

MACHINE TOOL SHOW..... 111
New Equipment at Machine Tool Show..... 113
Machine Tool Show Exhibitors..... 238

PRODUCTION ENGINEERING SHOW..... 209
Preview of Production Engineering Show..... 211
Production Engineering Show Exhibitors..... 240

COLISEUM MACHINERY SHOW..... 227
What's New at the Coliseum Machinery Show.... 229
Coliseum Machinery Show Exhibitors..... 242

NEWS PREVIEWS

Mercury Expanding Wayne Plant by 20 Per Cent 65
Oldsmobile Notes Air Conditioning Sales Rise.. 66
Square D to Build Plant in Royal Oak, Mich..... 67
Lancia and Fiat to Help Ferrari in Racing..... 69
Stockholders Approve Sale of Pressed Metals.. 70
Murray Cuts Another Bond with Automotive Field 71
Cross Plant Keyed to Automation and Atomic Age 72
Lincoln for 1956 Has 285-Hp Engine..... 234

DEPARTMENTS

High Spots of This Issue..... 63
News of the Automotive and Aviation Industries 65
Men in the News..... 75
Free Literature and Free Information Service.... 246
New Automotive and Aviation Products..... 248
Calendar of Coming Events..... 252
Shorties..... 254
On Our Washington Wire..... 260

Business Department Staff..... 63
Chilton Officers and Directors..... 63
Advertisers' Index..... 322

EDITORIAL STAFF

JAMES R. CUSTER, Editor — **H. H. ROBERTS**, Engineering Editor — **THOMAS MAC NEW**, Market Research Editor — **PAUL C. KENNEDY**, Machinery Editor

ANDREW SHEARER, News Editor — **ROBERT P. HOMER**, Art Editor — **MARCUS AINSWORTH**, Statistical Editor — **HOWARD KOHLBRENNER**, Art Director

DETROIT
Joseph Geschelin, Detroit Editor
Leonard Westrate, News Editor, Detroit
Edward Janicki, Associate Ed., Detroit

WASHINGTON
George H. Baker, Washington Editor
Ray M. Stroupe, Washington News Editor
Neil R. Regeimbal, Washington News Ed.

LOS ANGELES
R. Raymond Kay
Pacific Coast Editor

PARIS
W. F. Bradley
European Correspondent

LONDON
David Scott
British Correspondent

Paul Wooton, Washington Member, Editorial Board

As part of its worldwide automotive and aviation news coverage, AUTOMOTIVE INDUSTRIES is serviced by International News Service and has editorial correspondents in major United States and foreign industrial centers.

MEMBER — National Business Publications, Inc. — Society of Business Magazine Editors — Audit Bureau of Circulations

Copyright 1955 by Chilton Company (Inc.)

AUTOMOTIVE INDUSTRIES is a consolidation of The Automobile (weekly) and the Motor Review (weekly) May, 1902; Dealer and Repairman (monthly), October, 1903; the Automobile Magazine (monthly), July, 1907, and the Horseless Age (weekly), founded in 1895, May, 1918.

EDITORIAL EXECUTIVE OFFICES, Chestnut and 56th Sts., Philadelphia 39, Pa., U. S. A. Cable address—Autoland, Philadelphia.

AUTOMOTIVE INDUSTRIES. Published semi-monthly by Chilton Co., Chestnut & 56th Sts., Phila. 39. Entered as Second Class Matter October 1, 1935, at the Post Office at Philadelphia, Pa.; Under the Act of Congress of March 3, 1879. In case of Non-Delivery Return Postage Guaranteed. Subscription price: United States, United States Possessions, 1 year $2.00, 2 years $3.00. Canadian and Foreign, 1 year $5.00, 2 years $8.00; single copies, 25 cents, except Statistical Issue (Mar. 15th), $1.00

WORM GEARING—universal in its application—affords advantages for almost every power transmission job. Select worm-gear units to meet your need from the complete Cleveland line. Write now for new 180-page Catalog 400, just off press.

Photo of Michigan Crane & Conveyor parts-loader in the Commonwealth Industries, Inc., plant at Detroit, by courtesy of The Iron Age.

CLEVELAND helps increase furnace output 10%

DRIVING a conveyor that loads small parts into a continuous heat treat furnace 24 hours a day is punishing service. That's why Commonwealth Industries turned to a long-lasting, trouble-free Cleveland. Set up to maintain a steady, sure furnace-feeding pace, Cleveland helped increase furnace output 10% in one year's time. In addition, labor-savings of $17,500 were realized over the same year's period.

Wherever Clevelands serve—and you'll find them in most industries—engineers will tell you that Clevelands do their work under heavy loads, continuously or intermittently, no matter how severe the conditions, with a minimum of attention.

In or near your city, there's a Cleveland engineer ready to serve you. He will be glad to discuss your power transmission problems and suggest proper drives to meet your particular needs. The Cleveland Worm and Gear Company, 3274 East 80th Street, Cleveland 4, Ohio.

Affiliate: The Farval Corporation, Centralized Systems of Lubrication. In Canada: Peacock Brothers Limited.

CLEVELAND
Worm Gear
Speed Reducers

You are cordially invited to see
LATEST BAIRD MACHINES and TOOLING IN OPERATION
at the COLISEUM MACHINERY SHOW
Chicago Coliseum, Sept. 6-17, 1955 — Booth 619.

ASK BAIRD ABOUT IT

5th in a Series

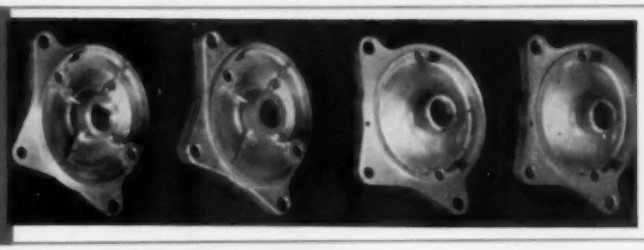
OF HIGH PRODUCTION CASE HISTORIES

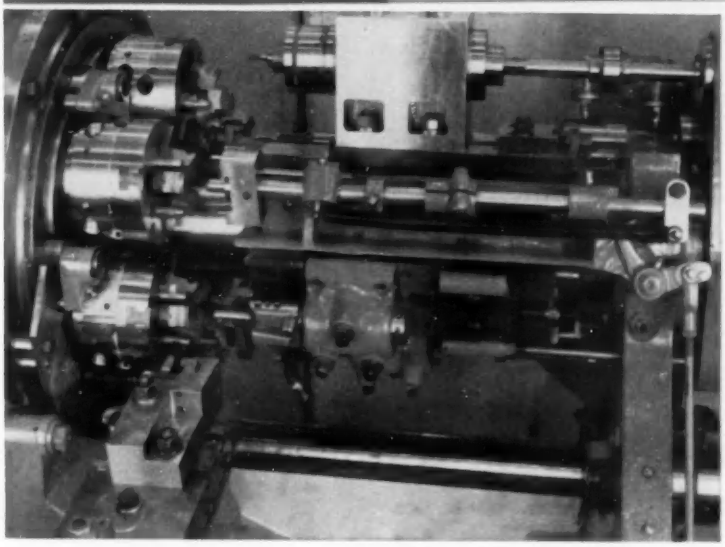
Baird Automatic Chucker again hits *PEAK PRODUCTION*

PART: Rear End Plate of Starting Motor

MATERIAL: Die-Cast Aluminum

PRODUCTION:
420 PIECES PER HOUR





OPERATIONS

Back face and chamfer one end of hub, using a recessing tool. Bore center hole concentric with flange diameters with high speed boring head. Face both sides of flange and turn the diameters concentric with hole. Bore a small hole off center with high speed boring head and tap two holes. The work is located in proper position and held stationary while the off-center hole is bored and the two holes tapped.

TOOLING...

The Baird Automatic 76H Chucking Machine is arranged for single indexing and with a recessing tool for back facing . . . high speed boring heads . . . two-spindle lead screw tapping attachment. A typical example of the endlessly varied and basically simple arrangements possible with this versatile unit.

Write Dept. AI

THE BAIRD MACHINE COMPANY
STRATFORD CONNECTICUT

WHERE YOU WILL GET THE HELP OF SPECIALISTS ON THESE ESSENTIAL PRODUCTION PROBLEMS:

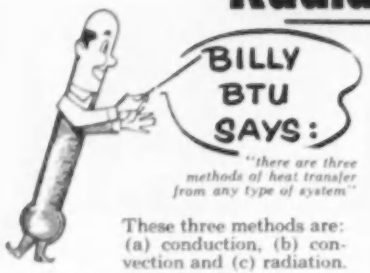
AUTOMATIC MACHINE TOOLS • AUTOMATIC WIRE & RIBBON METAL FORMING MACHINES • AUTOMATIC PRESSES • TUMBLING BARRELS

BRASS

Young Heat Transfer News

YOUNG RADIATOR COMPANY, RACINE, WIS.

Navy Selects Young Engine Cooling Radiators for Mobile Jet Starters



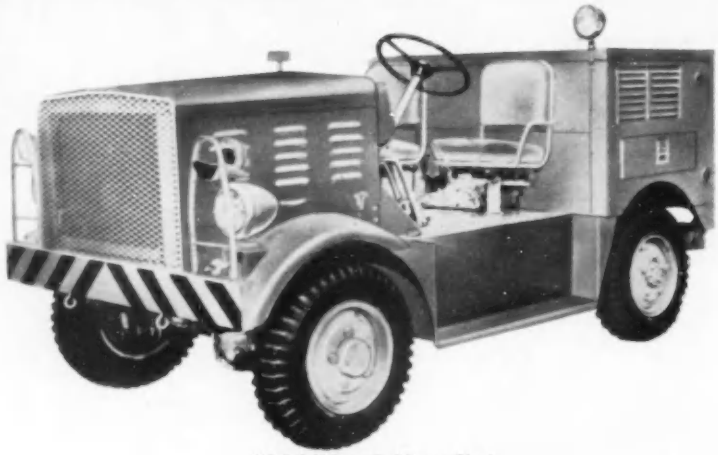
"there are three methods of heat transfer from any type of system"

These three methods are: (a) conduction, (b) convection and (c) radiation.

Heat transfer by conduction exists when heat flows within a body from one region of high temperature to another region of lower temperature by simple molecular communication. The amount of heat which can be transferred by conduction is dependent on the temperature difference, thermal conductivity of the material through which the heat is being conducted, the distance between the hot source and the cold sink, and the cross sectional area for heat flow.

Transfer of heat by forced convection depends on the velocity of the fluids over the surface through which heat is conducted . . . by the shape of the surface, by the area through which heat is conducted . . . and by various properties of the fluid as well as temperature difference.

The third general means of heat transfer is radiation. Here heat flows from the body of the higher temperature to the body of the lower temperature through space without any medium within the space. For further details on this subject write for free bulletin: "Heat: Forced Convection Removal From Industrial Hydraulic Circuits" to Young Radiator Company, Dept. 105-E, Racine, Wis.



NC-5 Self-Propelled Power Plant

NC-5 Self-Propelled Power Plants are being built for the United States Navy and United States Air Force by prime contractor Consolidated Diesel Electric Corporation, Stamford, Connecticut. The vehicle is used to supply electric current for starting, towing and servicing Navy and Air Force jet planes. Its maneuverability, flexibility and speed of starting or servicing a line of planes offers many advantages over stationary or trailer types of power equipment.

Young Radiator Company fabricated Radiators for cooling the engines of these highly-specialized vehicles.

Radiator design was important because the vehicle's engine drives the 37 kw generating unit while the vehicle is at rest. The Young Radiator is constructed as an extra rugged unit with copper fin and tube core, drawn brass top and bottom tanks, and sturdy sheet metal reinforcing side members.

Rear view Young Radiator used on Navy vehicle

For further details on Young Radiators write Young Radiator Company, Dept. 105-J, Racine, Wisconsin.

NEW FIXED TUBE BUNDLE HEAT EXCHANGER CATALOG

A complete description of stock and specially engineered Young Radiator Company Type "F" Fixed Tube Bundle Heat Exchangers is given in the newly revised Catalog No. 2154. For your copy, write Dept. 105-J, Young Radiator Company, Racine, Wis.

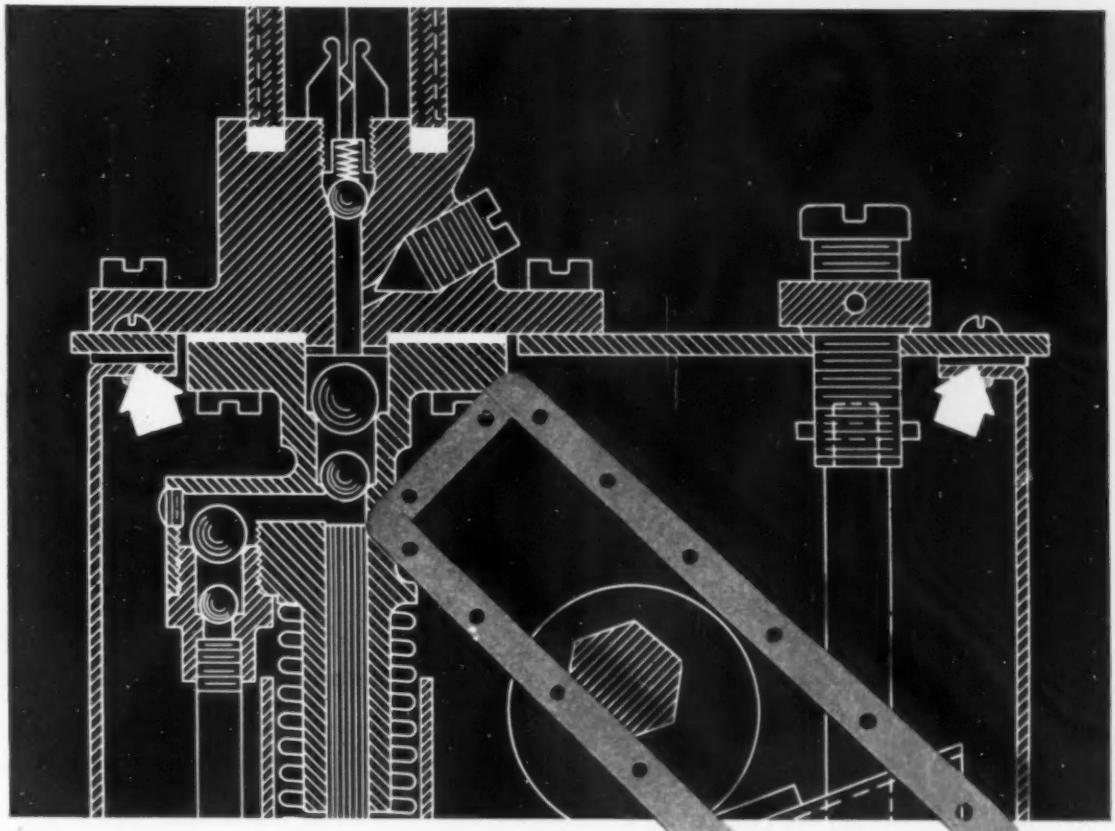
Young RADIATOR COMPANY

RACINE, WISCONSIN

Creative HEAT TRANSFER ENGINEERS FOR INDUSTRY

Heat Transfer Products for Automotive, Aviation and Industrial Applications. Heating, Cooling, Air Conditioning Products for Home and Industry.

Executive Office: Racine, Wisconsin, Plants at Racine, Wisconsin, Mattoon, Illinois



improved fiber gasket

won't shrink, costs less, reduces fabricating time

A manufacturer was using four strips of gasket material which he butted together to seal the oil tanks and covers of force feed lubricators.

But the material was fragile, often had "lace" or pinholes, and was subject to shrinkage. Also, the strips had to be cut from sheet material . . . and this didn't produce pieces long enough to fit the largest tanks without splicing.

Problems were ended and costs lowered, however, by using Armstrong CN-705 Accopac® in ribbon form. This fiber gasket material is made by a beater saturation process that locks the fiber and cork in a latex binder. The lubricator manufacturer found it to be a uniformly strong and flexible material, free of porosity. Accopac did not shrink or leak.

Gasket fabrication was simplified, too. An operator simply cut the Accopac ribbon to length, cemented it into place, and punched the bolt holes.

Perhaps Accopac in sheets, rolls, ribbon, or die-cut parts can solve your gasket problem, too. Write today for samples for your own evaluation.

FREE 24-PAGE GASKET MANUAL— Look for "Armstrong Gasket Materials" in Sweet's product design file . . . or write for your own copy to Armstrong Cork Company, Industrial Division, 7009 Imperial Avenue, Lancaster, Pennsylvania. **And be sure to specify Armstrong Gasket Materials when you order from your gasket cutter.**

Armstrong Accopac

. . . used wherever performance counts

WHAT	WHERE	WHY
SUNVIS 900	**In tight systems** where oil is rarely changed and little or no make-up is needed.	**Exceptionally long life** of oil keeps overall costs low.
SOLNUS	**In tight systems** where make-up oil is less than 5% per month.	**Moderately priced** . . . excellent stability and rust protection.
SUNTAC	**In leaky systems** where make-up average is 5% or over per month.	**Reduced leakage** in systems cuts oil costs and downtime.
CIRCO	**In systems** where oil is continuously diluted by water, cutting fluids and other contaminants.	**Low-priced** . . . excellent protection where oil must be changed frequently.
SUNVIS H.D. 700	**In systems contaminated** by dust and deposits of sludge, varnish, etc.	**Cleansing action** removes deposits and eliminates costly teardowns.
LUBEWAY	**In dual purpose systems** of machine tools where hydraulic oil is also a way lubricant.	**Added film strength** of this hydraulic oil also eliminates "stick-slip" on ways.

CHART SHOWS WHERE AND WHY SUN HYDRAULIC OILS SAVE MONEY

As the chart shows, to operate your hydraulic system at maximum efficiency and minimum cost you must consider the condition of your hydraulic system, as well as pressures, operating temperatures and other usual factors.

And, very important, you must consider the age of your system. Continued use of original oil recommendations can be costly. A change in the type of oil can often result in substantial savings...especially where systems have developed leaks or where sludge and varnish cause excessive maintenance.

For complete information about how Sun hydraulic oils can help you cut operating costs of your hydraulic system, see your Sun representative...or write SUN OIL COMPANY, Philadelphia 3, Pa. Dept. AA-9.

SUNOCO

INDUSTRIAL PRODUCTS DEPARTMENT

SUN OIL COMPANY PHILADELPHIA 3, PA.

IN CANADA: SUN OIL COMPANY, LTD., TORONTO AND MONTREAL

AND NOW

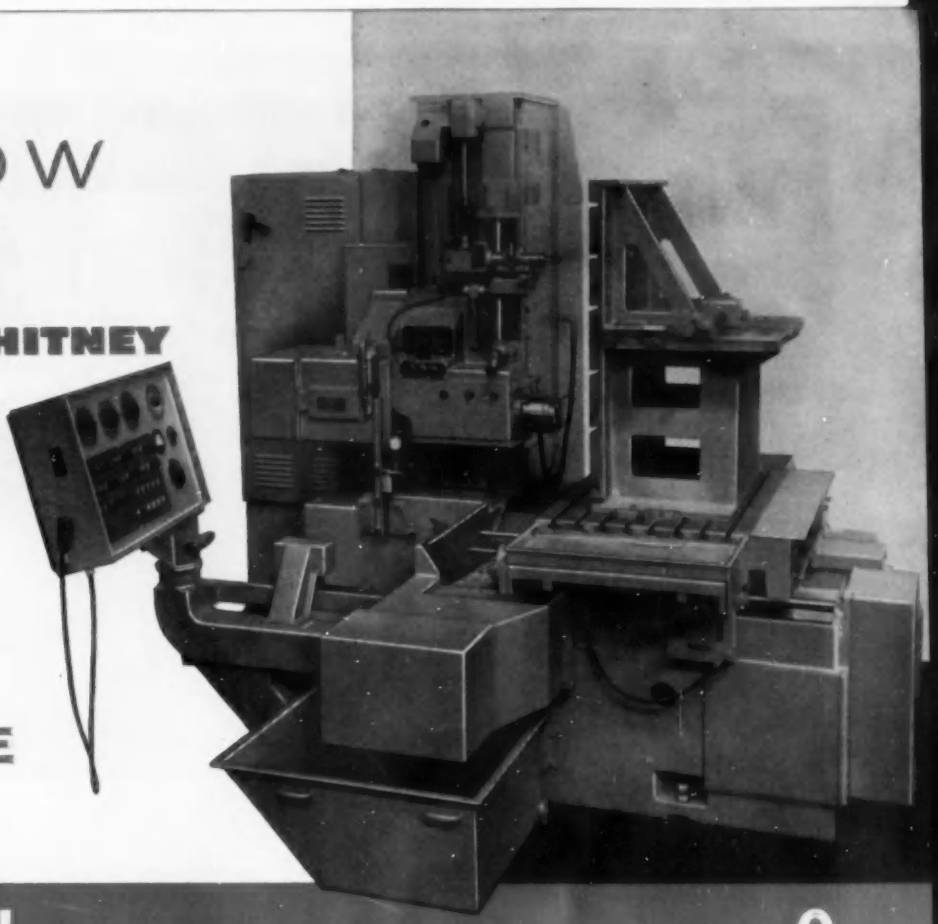
A NEW

PRATT & WHITNEY

KELLER

AUTOMATIC
TRACER-CONTROLLED
MILLING

MACHINE



THE BL 3622 MODEL C

WITH THESE IMPORTANT *NEW FEATURES* . . .

- **HEAVIER, MORE RUGGED** . . . to take tough production schedules in stride day after day.
- **MORE POWER (10 hp)** . . . for increased metal removing capacity on today's tough new alloys.
- **BIGGER CAPACITY** . . . to handle larger, heavier workpieces.
- **WIDER RANGE of SPINDLE SPEEDS** . . . with a single, full-range spindle for all speeds . . . 30 to 3600 rpm in 20 steps. Spindle furnished with either No. 12 B&S or No. 50 MM taper bore.
- **POWER DRIVEN CHIP CONVEYOR** . . . no need to stop and shovel chips piled up by fast metal removal.
- **FASTER TRACER RESPONSE** . . . through a new electronic control of machine motions, travel speeds, and feeds.
- **PHENOLIC-TO-METAL BEARING SURFACES** . . . eliminate scoring of ways and preserve original high accuracy.
- **OPTIONAL RAPID TRAVERSE** . . . for vertical and horizontal movements.
- **ONE-SHOT LUBRICATION SYSTEM** . . . insures quick, positive thorough lubrication of all important sliding surfaces.

The NEW BL 3622, Model C is a powerful, horizontal spindle miller that reproduces the shape of any 2-dimensional template or 3-dimensional full model quickly and accurately. Complex or irregular dies, molds, prototypes and other workpieces that cannot be conveniently machined by any other method are handled as easily and economically as simple work. The Keller BL Machine is built ***specifically*** for tracer-controlled milling — not just "adapted". It is rugged, dependable, relatively simple . . . stays on the job year after year.

PRATT & WHITNEY

DIVISION NILES-BEMENT-POND COMPANY

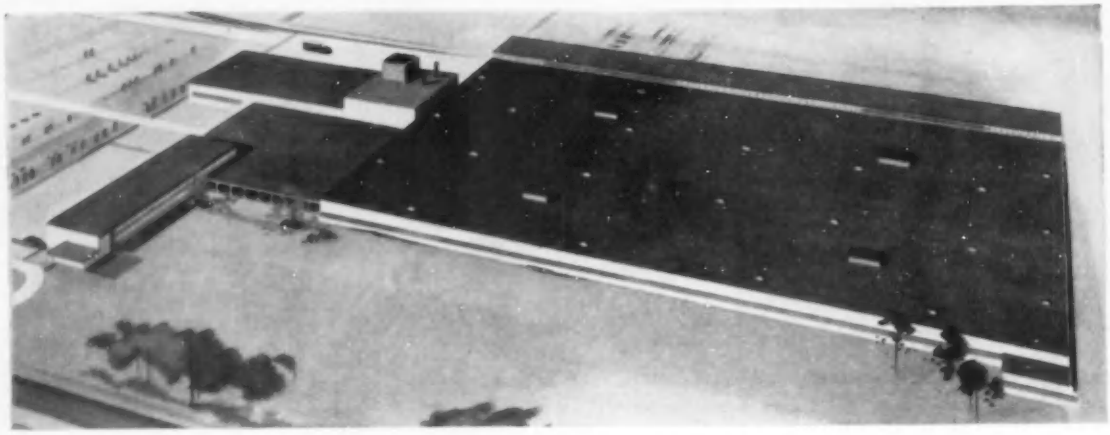
WEST HARTFORD 1, CONNECTICUT, U.S.A.

BRANCH OFFICES . . . BIRMINGHAM • BOSTON • CHICAGO
CINCINNATI • CLEVELAND • DETROIT • LOS ANGELES
NEW YORK • PHILADELPHIA • PITTSBURGH • ROCHESTER
SAN FRANCISCO • ST. LOUIS • **EXPORT DEPT.**, WEST HARTFORD

FOR COMPLETE INFORMATION . . . write on your Company letterhead for P&W Circular No. 588 . . . or phone the P&W Branch Office near you.

FIRST CHOICE FOR ACCURACY SINCE 1860 — MACHINE TOOLS • CUTTING TOOLS • GAGES

New Automotive Manufacturing Facilities now being built by Thompson



With high compression, speed and power among the biggest features of today's automobile models . . . and tomorrow's too . . . chassis design improvement has become an important factor in future planning.

The big news of 1955 is the recent announcement of a new multimillion-dollar Thompson factory now being built and soon to open in the Detroit area . . . with the world's most modern automotive parts manufacturing facilities, incorporating automation and low-cost operation.

The tremendous acceptance of Thompson steering-linkage, and other chassis parts (including the revolutionary Thompson-engineered front suspension ball joints) makes this new expansion necessary. Present manufacturing facilities at Thompson plants in Detroit and other cities are already working at full capacity.

The highly efficient layout of the new Detroit plant promises the development of new and advanced manufacturing techniques, finer steering-linkage and suspension parts, and, of course, even better service to Thompson customers. So have your engineers call on Thompson to help iron out your steering-linkage and suspension problems.

Write, wire or phone Thompson Products, Inc., Michigan Division, 7881 Conant Avenue, Detroit 11, Michigan, WA 1-5010.

You can count on Thompson Products

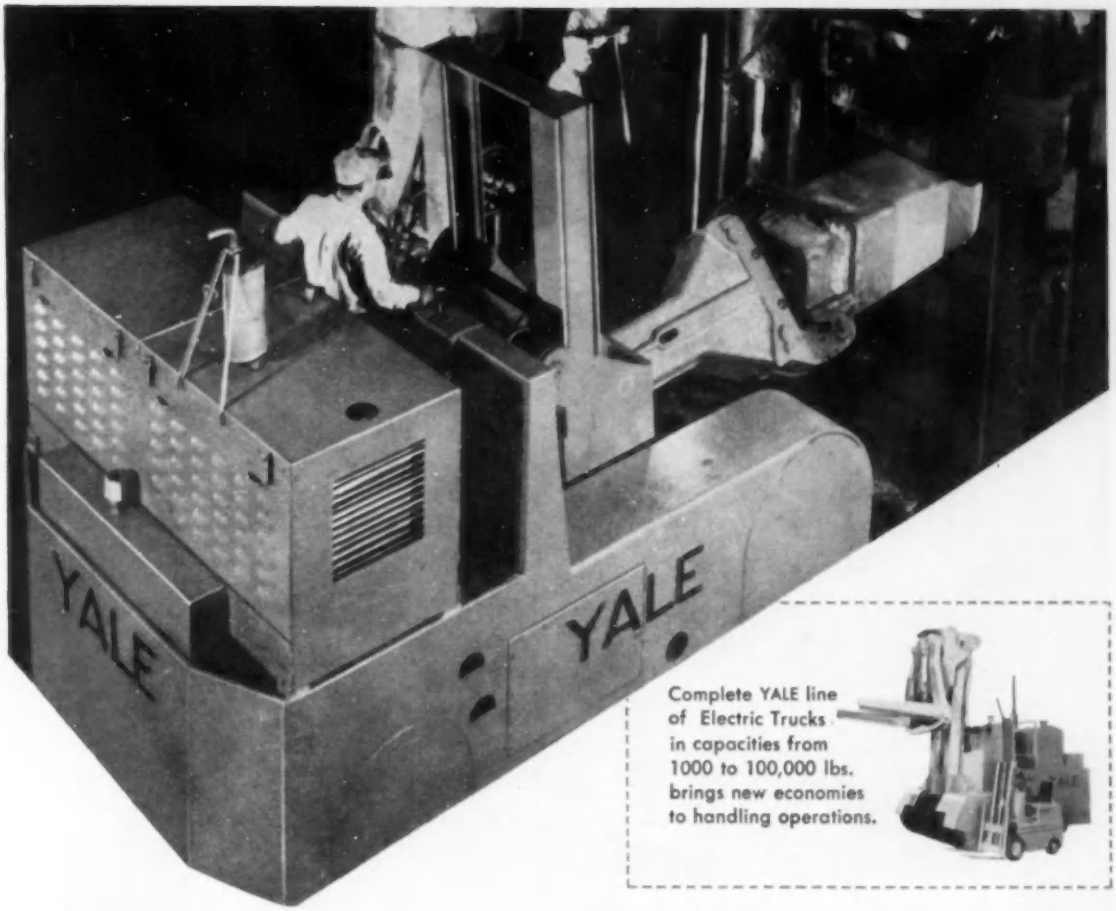
Michigan Division: Detroit • Fruitport • Portland

HOW THOMPSON STEERING-LINKAGE PARTS ARE "TORTURE-TESTED":

Double-Tested—week after week, 24 hours a day, extra-severe punishment is dealt out to Thompson's experimental and standard steering linkages, suspension ball joints, and other chassis parts.

In Addition—these parts undergo further tests in standard-model cars out on the open road . . . not only on average highways, but also on rutty, muddy and snowbound back roads.

Results?—These "torture tests", followed by skilled analyses by experienced Thompson engineers, result in the finest possible linkage and suspension systems for cars, buses, trucks, tractors.



Complete YALE line of Electric Trucks in capacities from 1000 to 100,000 lbs. brings new economies to handling operations.

Yale Truck speeds handling of 5 ton ingots

... AND BEHIND THE "FIRING LINE" OTHER YALE TRUCKS BRING OUT-OF-THE-ORDINARY SAVINGS TO ROUTINE HANDLING JOBS

This powerful YALE Industrial Truck is equipped with a special ingot-revolving attachment for faster forging of multi-ton ingots. Both truck and attachment are typical of YALE versatility in solving any sort of handling problem for the metals industry. On the production line, in receiving, shipping and storage, YALE Gas, Electric and Diesel Trucks work harder, last longer, handle smoother. They are engineered to resist shock loads better—thus reducing operator fatigue, extending truck life and increasing handling savings. For detailed information, send coupon today.

YALE* **INDUSTRIAL LIFT TRUCKS AND HOISTS**

*Reg. U. S. Pat. Off.

Gas, Electric, Diesel & LP-Gas Industrial Trucks • Worksavers Warehousers • Hand Trucks • Hand & Electric Hoists

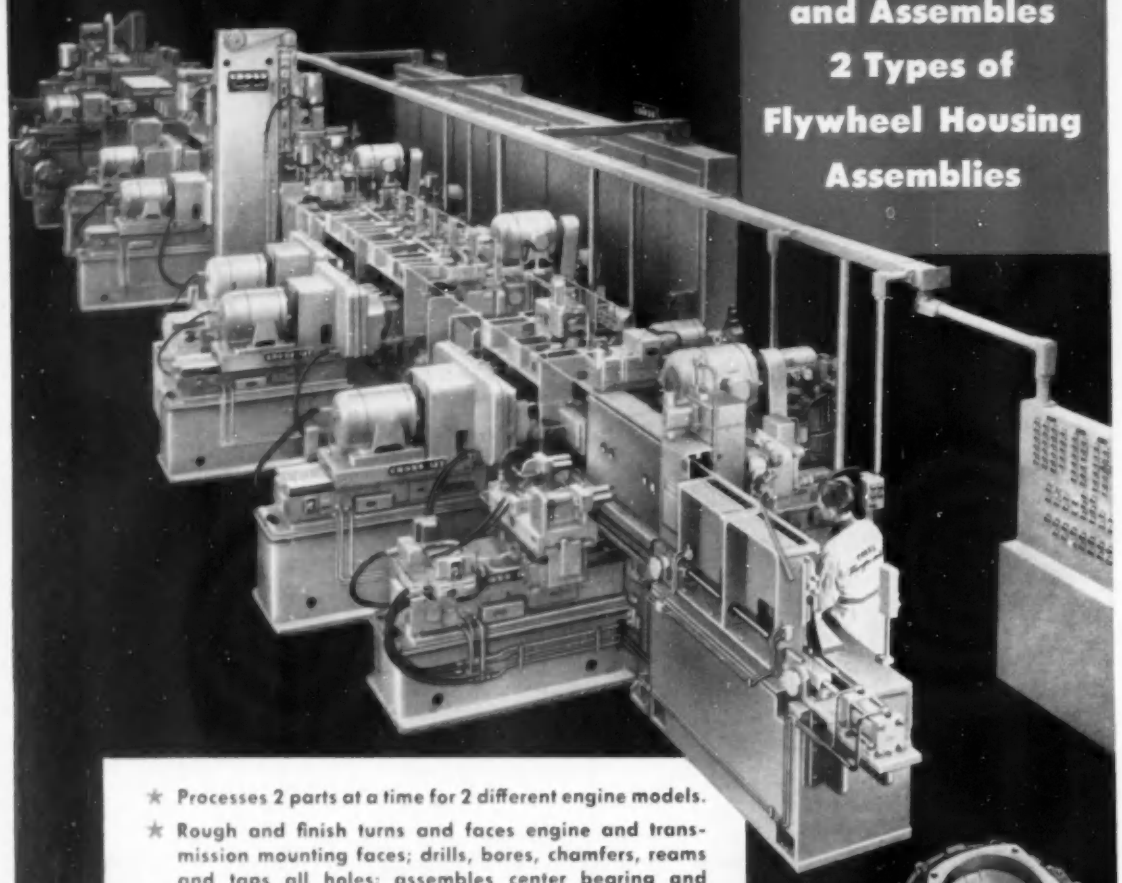
MAIL THIS COUPON TODAY

The YALE & TOWNE Manufacturing Co., Dept. 79
Roosevelt Boulevard, Philadelphia 15, Penna.
Please send detailed information on YALE Industrial
☐ Gas Trucks ☐ Electric Trucks
☐ Worksavers-Warehousers

Company_____
Name_____ Title_____
Street_____ City_____ State_____
In Canada write: The Yale & Towne Manufacturing Co.
St. Catharines, Ontario, Canada

Another Transfer-matic by Cross

Bores, Faces, Drills and Assembles 2 Types of Flywheel Housing Assemblies



★ Processes 2 parts at a time for 2 different engine models.

★ Rough and finish turns and faces engine and transmission mounting faces; drills, bores, chamfers, reams and taps all holes; assembles center bearing and 2 dowels; finish bores and inspects center bearing after assembly; washes, dries parts for final assembly.

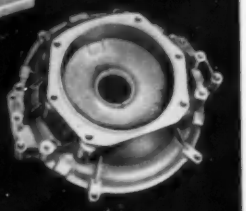
★ 314 pieces per hour at 100% efficiency.

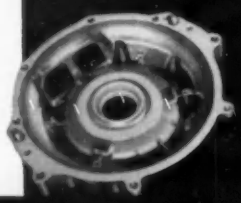
★ 20 stations: 1 loading; 10 machining; 2 assembling; 4 inspecting; 2 cleaning; 1 unloading.

★ Pre-set tools to reduce downtime for tool changing.

★ Complete interchangeability of all standard and special parts for easy maintenance.

★ Other features: Construction to J.I.C. standards; hydraulic feed and rapid traverse; hardened and ground ways; automatic lubrication.





Established 1898

THE CROSS CO.

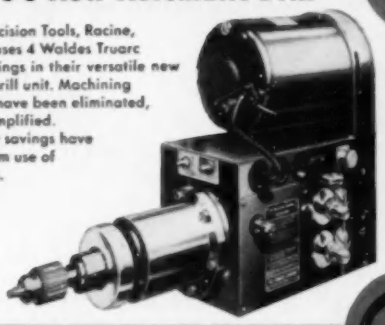
DETROIT 7, MICHIGAN

Special MACHINE TOOLS

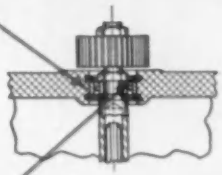
4 Waldes Truarc Rings Cut Costs Drastically, Increase Versatility of Precision Automatic Drill

Dumore's New Automatic Drill

Dumore Precision Tools, Racine, Wisconsin, uses 4 Waldes Truarc Retaining Rings in their versatile new automatic drill unit. Machining operations have been eliminated, assembly simplified. Great labor savings have resulted from use of Truarc rings.

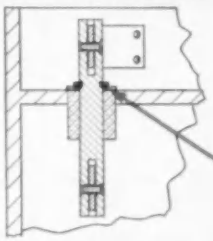


Drive Spindle Assembly



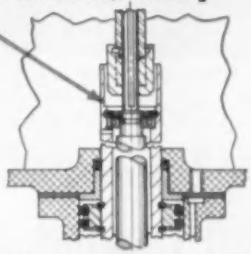
Bearing is held in position by two Waldes Truarc Rings—Standard (Series 5000) and Bowed (Series 5001). Two grooves are turned and housing rough bored in one operation. Alternate method would require at least two additional machining operations. Bowed Truarc ring takes up accumulated tolerances resiliently.

Actuator Lever Shaft Assembly



A Single Waldes Truarc External Retaining Ring (Series 5100) acts as shoulder, holds the lever in position. Labor savings are tremendous—a simple groove cutting operation replaces turning a shoulder, grinding and polishing.

Piston Assembly



Easy assembly is assured by use of one Waldes Truarc Bowed Ring (Series 5001) to lock the bearing to the piston assembly. When unit is to be used in tapping applications, entire spindle assembly can be removed without disassembly.

Whatever you make, there's a Waldes Truarc Retaining Ring designed to improve your product...to save you material, machining and labor costs. They're quick and easy to assemble and disassemble, and they do a better job of holding parts together. Truarc rings are precision engineered and precision made, quality controlled from raw material to finished ring.

36 functionally different types...as many as 97 different sizes within a type...5 metal specifications and 14 different finishes. Truarc rings are available from 90 stocking points throughout the U.S.A. and Canada.

More than 30 engineering-minded factory representatives and 700 field men are available to you on call. Send us your blueprints today...let our Truarc engineers help you solve design, assembly and production problems...without obligation.

For precision internal grooving and undercutting...Waldes Truarc Grooving Tool!

Send for new catalog supplement

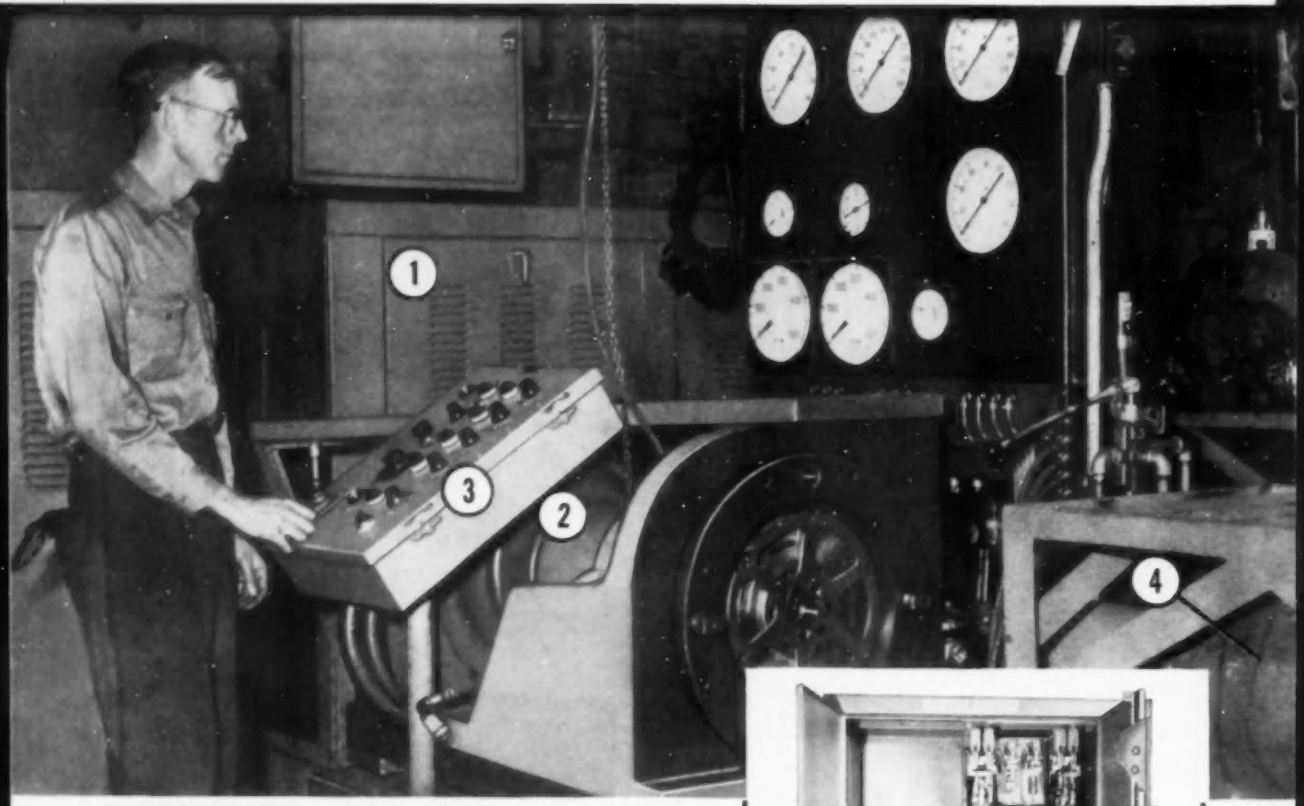
WALDES TRUARC® RETAINING RINGS

Waldes Kohinoor, Inc., 47-16 Austel Place, L. I. C. 1, N. Y.
Please send the new supplement No. 1 which brings Truarc Catalog RR 9-52 up to date.
(Please print)

Name _____
Title _____
Company _____
Business Address _____
City _____ Zone ___ State _____

AY 097

WALDES TRUARC Retaining Rings, Grooving Tools, Pliers, Applicators and Dispensers are protected by one or more of the following U. S. Patents: 2,382,948; 2,411,426; 2,411,761; 2,416,852; 2,420,921; 2,428,341; 2,439,785; 2,441,846; 2,455,165; 2,483,379; 2,483,380; 2,483,383; 2,487,802; 2,487,803; 2,491,306; 2,491,310; 2,509,081; 2,544,631; 2,546,616; 2,547,263; 2,558,704; 2,574,034; 2,577,319; 2,595,787, and other U. S. Patents pending. Equal patent protection established in foreign countries.



G-E JIC SPEED VARIATOR on test stand of a leading automotive manufacturer. Compact power unit (1) in background, drive motor (2) underneath operator's control (3) and inductor dynomometer (4) lower right.

G-E product-engineering reports . . .

JIC Speed Variators give you precise power for parts testing

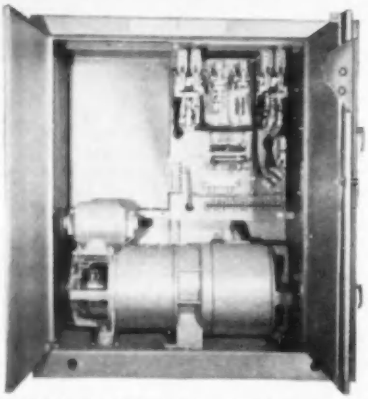
General Electric packaged JIC Speed Variators used to drive machine tools, conveyors and hoists in the automotive industry are also building a reputation for use in automotive component testing.

WIDE SPEED RANGES, precise speed regulation, speed of response, low maintenance and easy installation features of this *"packaged"* drive are ideal for driving transmissions, axles, differentials, etc., on test stands. Its extreme versatility helps you keep pace with new, higher-speed component developments.

IN TYPICAL TEST SYSTEM above, Speed Variators supply 30 hp continuously at 2000 to 5000 rpm under close regulation to a transmission. Output is measured, with or without load, by a G-E inductor dynamometer. The precise power and accurate measurement of G-E Speed Variators and Dynamometers allow you to simulate most road conditions and obtain accurate readings.

YOUR G-E SALE REPRESENTATIVE has complete information. Contact him at your nearby G-E Apparatus Sales office or write for a copy of GEA-6000, JIC Speed Variators. Section 815-4, Direct Current Motor and Generator Department, General Electric Company, Erie, Pa.

GENERAL ELECTRIC



COMPACT POWER UNIT contains m-g set and all control. Needs no special foundation for installation and includes such JIC features as interlocked doors, positive ventilation system, and color-coded wiring.

DC DRIVE MOTOR, of rugged, totally enclosed construction, provides better protection against dirt, dust and contaminants.

OPERATOR'S CONTROL includes push-buttons and rheostat in NEMA 12 enclosure or components may be integrated with master control panel.

FILTRATION for AUTOMATION

Delpark

MAKES AN ASSIST ON Quality Control AT IBM

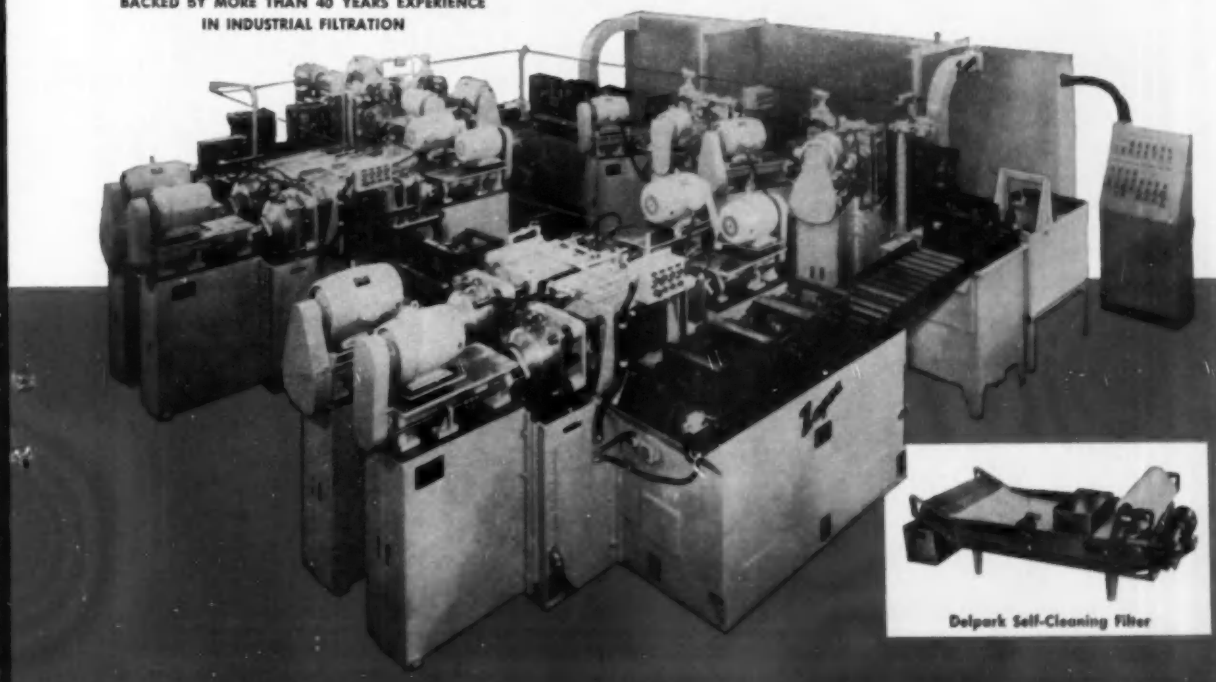
These Zagar pallet-type transfer machines at IBM perform numerous drilling operations on aluminum frames for the famous IBM typewriters.

Here is a fine example of Automation . . . and backing up this unit is automation in filtration. You won't see it in the picture, but . . . Delpark filtration cleans coolant from the 206 drill spindles. Greater accuracy of drill hole size, longer drill life, more efficient tool operation are but a few of the major savings gained through Delpark filtration. Delpark is one reason why up to 144 parts per hour are handled on this unit with but two operators. Credit IBM and Zagar tool engineering for foresight . . . credit IBM tool service for production know-how . . . credit Delpark for filtration as modern as today's automation.

For your filtration problems . . . for automation or normal procedure . . . contact Delpark for competent field engineering. There's no obligation. *Write today.*

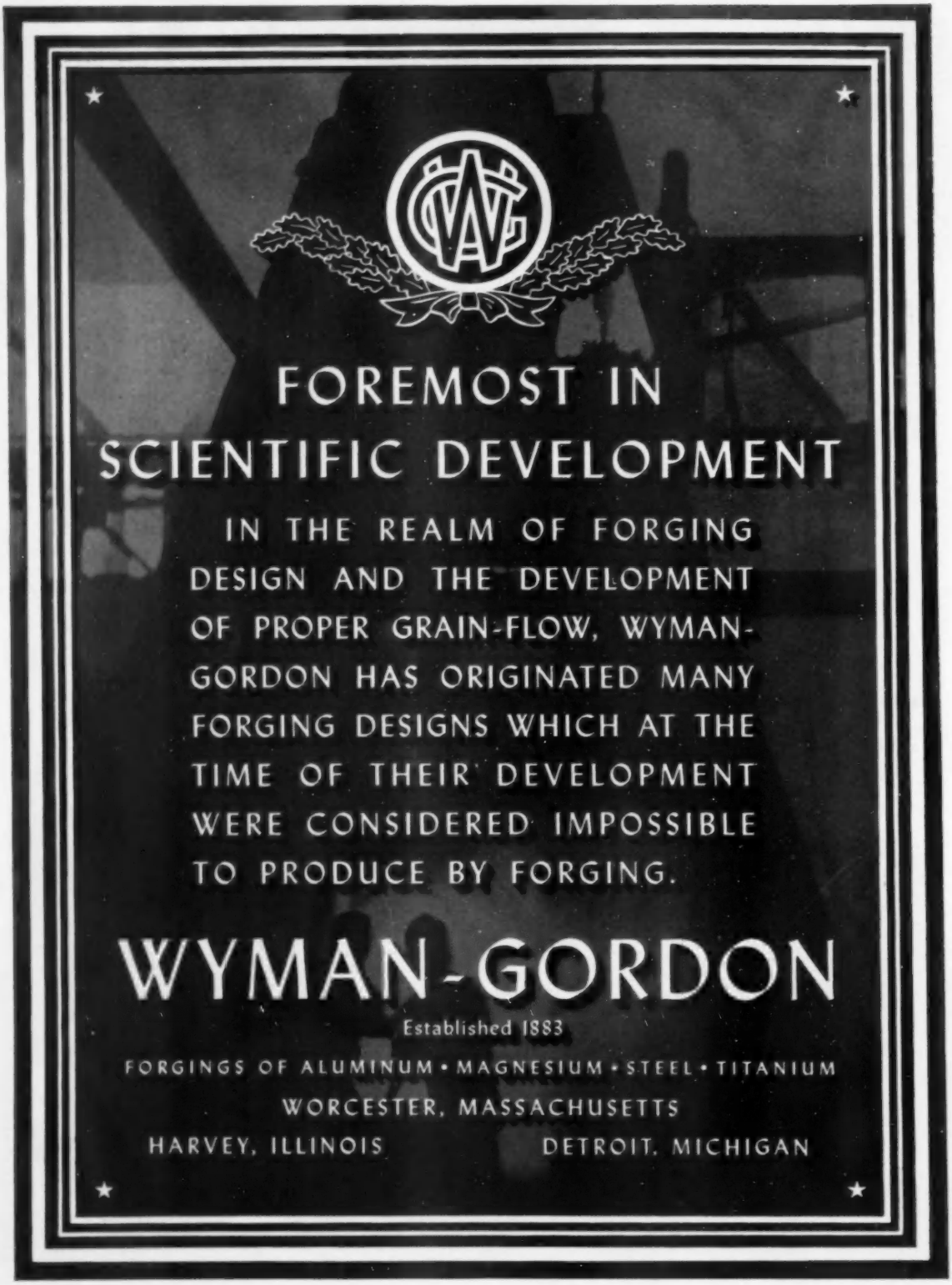
DELPARK INDUSTRIAL FILTRATION

BACKED BY MORE THAN 40 YEARS EXPERIENCE IN INDUSTRIAL FILTRATION



Delpark Self-Cleaning Filter

INDUSTRIAL FILTRATION COMPANY, 19 INDUSTRIAL AVENUE, LEBANON, INDIANA


FOREMOST IN
SCIENTIFIC DEVELOPMENT
IN THE REALM OF FORGING DESIGN AND THE DEVELOPMENT OF PROPER GRAIN-FLOW, WYMAN-GORDON HAS ORIGINATED MANY FORGING DESIGNS WHICH AT THE TIME OF THEIR DEVELOPMENT WERE CONSIDERED IMPOSSIBLE TO PRODUCE BY FORGING.
WYMAN-GORDON
Established 1883
FORGINGS OF ALUMINUM • MAGNESIUM • STEEL • TITANIUM
WORCESTER, MASSACHUSETTS
HARVEY, ILLINOIS
DETROIT, MICHIGAN

Another new development using

B. F. Goodrich Chemical *raw materials*

Geon and the Thunderbird

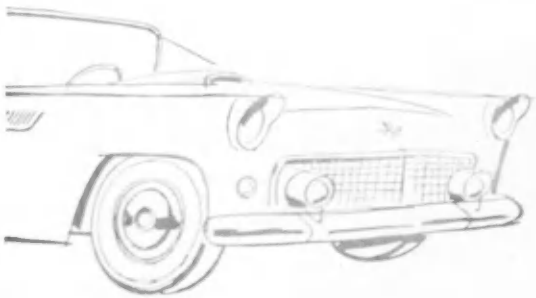
SOUNDS like the title for an exciting story—and it is! Ford's Thunderbird is one of America's most exciting cars, the long, low-slung beauty that everybody knows at sight and wishes he owned!

Geon polyvinyl materials come into the story with colorful interior upholstery that is rich-looking, yet rugged. Fact is, the Thunderbird is a good example of the versatility of Geon polyvinyl materials. The battery cable and parts of the electrical wiring system are protected by Geon-made insulation.

The wide range of uses and the many advantages of Geon account for its success in industry. For Geon is insulation, upholstery, sponge, rigid vinyl pipe, screening and even weatherproof roofing.

A thousand and one new decorative and functional uses are within your reach. Perhaps the next Geon success story will be yours. For technical information, please write Dept. BA-5, B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ontario.

B. F. Goodrich Chemical Company does not manufacture upholstery or other components for the Thunderbird. We supply the Geon polyvinyl materials only.



GEON RESINS
GOOD-RITE PLASTICIZERS...
the ideal team to make products easier, better and more saleable.

GEON polyvinyl materials
HYCAR American rubber and latex
GOOD-RITE chemicals and plasticizers
HARMON colors

Compare

...AND YOU'LL SEE WHY

Increased Production Costs Less with DANLY PRESSES

Feature for feature, *you* can compare Danly presses with all others and see why far-sighted, progressive management prefers Danly. Such point-by-point, feature-for-feature comparison is exactly what one of the world's largest builders of autos and trucks made. Result? They bought and installed Danly Presses in their new production lines.

Now, after more than two years of continuous, high-speed production, these presses have "proved out" with a truly outstanding performance record. First, they have been charged with *only four man days* for other than routine maintenance. During this same period, *shift production averages have been consistently higher* for long, continuous runs. The cost advantage and over-all output gain is obvious.

Other indirect benefits were noted, too. *Installation* of all the presses was completed without overhaul or major adjustment. Also, the dependability of the Danly Presses made it unnecessary to maintain costly stocks of press spare parts – an important cost saving in itself.

Danly Presses will "prove out" in your plant the same way. Use the check list shown now . . . make your own comparison and see why Danly Presses will give you increased production at lower cost.

It costs less to run a DANLY PRESS

DANLY MACHINE SPECIALTIES, INC.
2100 South Laramie Avenue • Chicago 50, Illinois

DANLY

USE THIS CHECK LIST

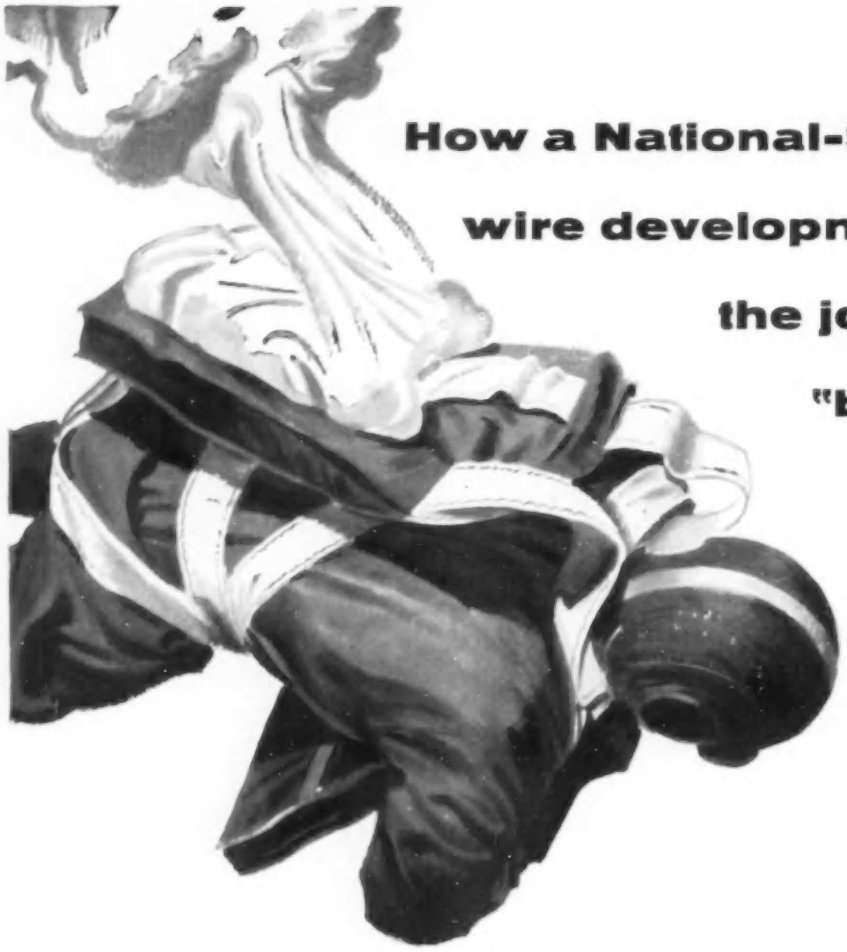
...Compare Danly Presses, feature for feature, with any other press on the market. See Danly Presses in action at the Machine Tool Show.

COMPARE	FEATURE	DANLY	OTHER
INSTALLATION COSTS	Danly presses are delivered already "run-in" tested. Faster installation is assured by assembly and operation in the Danly plant.	✓	
DRIVE	Danly's cool-running clutch lasts up to 7 times longer. Herringbone type gears and anti-friction bearings on high speed shafts wear longer.	✓	
CONSTRUCTION	Danly presses are made entirely of heavy stress-relieved steel weldments. Extra heavy internal ribbing decreases deflection.	✓	
LUBRICATION	Danly features completely automatic oil lubrication. When any vital area is not being sufficiently lubricated, safety switch stops press.	✓	
MAINTENANCE	Performance records in the country's biggest stamping shops prove that Danly Presses require less maintenance, greatly reduce spare part needs.	✓	
CONTROLS	Special Danly Control arrangements make operation easier and safer, minimize accidental damage, facilitate automation—can be completely enclosed.	✓	

Big maintenance saving factors are the Danly Cool Running Clutch designed for longer wear, easier accessibility and completely automatic oil lubrication.

Extra long gibbing to maintain precision slide alignment and greater over-all rigidity of construction help assure uninterrupted production for long runs.

Pre-assembly and testing before shipment, especially of control circuits and wiring, saves valuable installation time.



How a National-Standard wire development took the jolts out of "bail-outs"

● Until recently, when a pilot "hit the silk", the shock was almost more than his frame could absorb. A better parachute harness was needed.

A leading spring maker brought this problem to National-Standard.

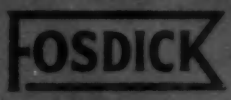
Our engineers came up with a special stainless steel wire that would take the severe forming stresses created in coiling long, thin springs. In addition, this wire could be made into springs with unusual resistance to permanent set. And, finally, this wire enabled the spring designer to create a spring with high initial tension . . . a sort of delayed action characteristic which prevented the spring from opening until the severe shock of deceleration was applied.

We solved this problem by staying with it long after most wire and steel makers would have given up. It is this stay-with-it approach that has enabled National-Standard to solve more of the fussy problems in steel and wire making than anyone else in the industry.

If you have a need for steel or wire with unusual or even "impossible" characteristics, check first with National-Standard. We may already be making such products. And, if we don't know how to make it now, we'll learn.

NS NATIONAL-STANDARD Company NILES, MICHIGAN

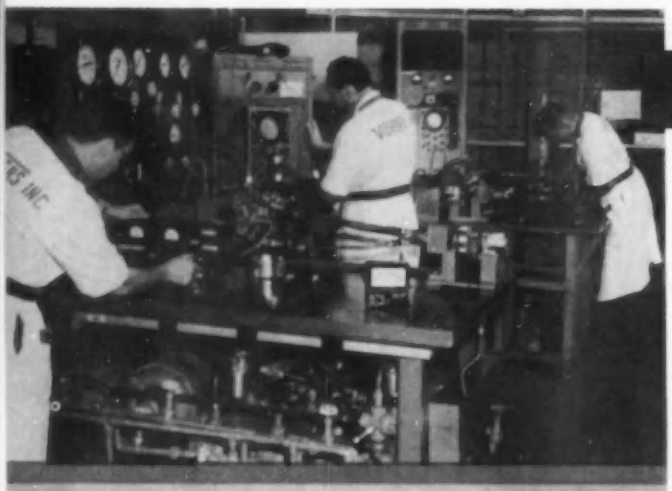
NATIONAL-STANDARD COMPANY • NILES, MICHIGAN
Tire Wire, Stainless, Fabricated Braids and Tape
ATHENIA STEEL DIVISION • CLIFTON, N. J.
Flat, High Carbon, Cold Rolled Spring Steel
REYNOLDS WIRE DIVISION • DIXON, ILLINOIS
Industrial Wire Cloth
WAGNER LITHO MACHINERY DIVISION • JERSEY CITY, N. J.
Special Machinery for Metal Decorating
WORCESTER WIRE WORKS DIVISION • WORCESTER, MASS.
Round and Shaped Steel Wire, Small Sizes



These 54 COMPANIES Use VICKERS® HYDRAULICS on Machines They are Exhibiting at the MACHINE TOOL SHOW

Why VICKERS HYDRAULICS PREDOMINATES on Modern Machine Tools

The large number of Vickers-equipped machine tools that you will see in the Show is no accident. It is due to wide recognition of the many advantages of Vickers Oil Hydraulics. Some important reasons behind this preference for Vickers are mentioned here. There are many more . . . the nearest Vickers Application Engineer will be glad to discuss them with you.



LONG-ESTABLISHED QUALITY

Vickers leadership in quality is the summation of many things. Important among these is the program of continuous research that has been maintained through the years and has resulted in a long and impressive list of pioneering developments. Representative of these are: Hydrostatic Relief Valve . . . Balanced Vane Type Pump . . . Flow Control Compensator . . . Axial Piston Pump and Motor. These, and many other developments by Vickers during more than three decades, have contributed substantially to the advancement of hydraulics for machine tools.

FACTORY-TRAINED APPLICATION ENGINEERS

Thoroughly trained in all phases of oil hydraulics at Vickers plants, this large group of salaried men is exceptionally well qualified to help make hydraulics more useful. They command the wealth of Vickers Hydraulics resources to perform many services . . . from complete circuit design to helping get the "bugs" out of a prototype machine.

Be Sure to See the VICKERS Exhibit at the Machine Tool Show, Booth 814.

STANDARD VICKERS UNITS CAN BE COMBINED TO *Economically* PROVIDE EVERY HYDRAULIC POWER and CONTROL FUNCTION

Single Stage Balanced Vane Type Pump . . . the most widely used of all pumps in oil hydraulic service.

Two-Pressure Pump automatically delivers larger volume at low pressure and smaller volume at high pressure.

Variable Delivery Axial Piston Type Pump has low inertia forces, higher rotative speeds and very high efficiency.

Power Unit is a compact self-contained power source that frequently results in design simplification and cost savings.

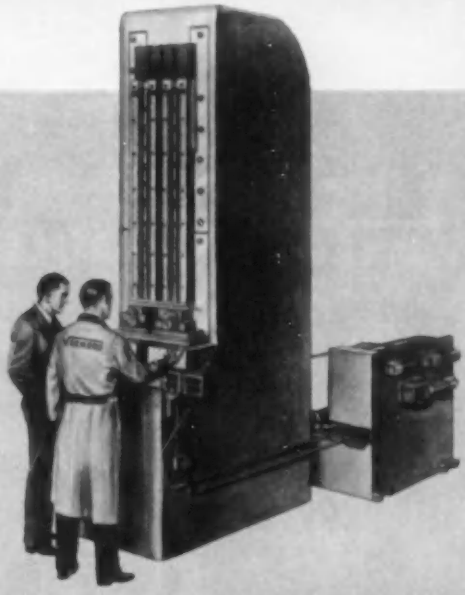
Balanced Piston Type Relief Valve more accurately controls system operating pressure and protects against overload.

"Hydrocushion" Type Pressure Control Valve for control of unloading and sequence of oil flow in hydraulic system.

Why VICKERS HYDRAULICS PREDOMINATES on Modern Machine Tools

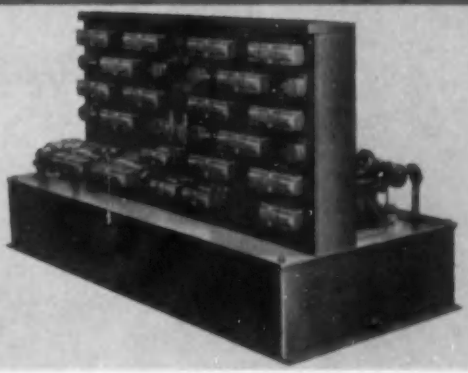
FACTORY-TRAINED FIELD SERVICE SPECIALISTS

Vickers equipment is designed and built to hold service requirements to an irreducible minimum. But no machinery built by man escapes service completely. When Vickers equipment requires service, it is handled by full-time Field Service Specialists working out of Vickers offices from coast to coast. These men, carefully trained in Vickers plants, are thoroughly competent to adjust and maintain all Vickers equipment . . . and qualified to instruct customers' service organizations in improving their own hydraulic maintenance practices.



UNDIVIDED RESPONSIBILITY

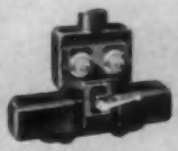
Many machine builders prefer to use Vickers hydraulic equipment exclusively because it gives them the advantage of undivided Vickers responsibility. Since 1921, Vickers has accumulated a great store of specialized knowledge in hydraulics . . . has developed the extensive line of equipment needed to take undivided responsibility. With Vickers equipment throughout, there is no risk of incompatibility of hydraulic components . . . optimum operation is assured.



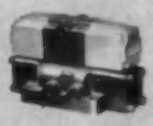
For further information, ask for new Catalog 5001A.

STANDARD VICKERS UNITS CAN BE COMBINED TO *Economically* PROVIDE EVERY HYDRAULIC POWER and CONTROL FUNCTION

Adjustable Flow Control Valve that eliminates jumping and speed variation because of load change.



Traverse and Feed Cycle Control Panel provides any sequence of rapid advance, adjustable feed, dwell and rapid return.



Solenoid Controlled Pilot Operated 4-Way Valve for controlling direction of oil flow remotely and electrically.

Deceleration Valve smoothly diminishes (or increases) oil flow as cam mechanism depresses the valve plunger.

Vane Type Hydraulic Motor has hydraulic balance, high efficiency and exclusive "rocking-beam" construction.

"Compact" Hydraulic (Oil) Cylinder has piston rings or improved cup seals and is available in 5 standard mountings.

These 54 COMPANIES Use

VICKERS HYDRAULICS

on Machines They are Exhibiting at the MACHINE TOOL SHOW

AMERICAN

ARTER

BARBER COLMAN

BARDONS & OLIVER

CLEVELAND

COLONIAL BROACH CO. DETROIT 13

CROSS ESTABLISHED 1885 DETROIT U.S.A.

DANLY

GALLMEYER & LIVINGSTON

GEARGRIND Detroit

G&L HYPRO DAVIS

GISHOLT

GOULD & EBERHARDT INCORPORATED

GRAY

GREENLEE

J&L

KEARNEY & TRECKER MILWAUKEE

KENT OWENS TOLEDO OHIO

KING

THE LODGE & SHIPLEY COMPANY

LeBLOND of Cincinnati

MATTISON MACHINE WORKS

MICHIGAN TOOL CO.

MOTCH & MERRYWEATHER

NATCO

NORTON GRINDERS and LAPPERS

7270

VICKERS INCORPORATED

DIVISION OF SPERRY RAND CORPORATION

1400 OAKMAN BLVD. • DETROIT 32, MICH.

Application Engineering Offices:

ATLANTA • CHICAGO AREA (Brookfield) • CINCINNATI • CLEVELAND
DETROIT • HOUSTON • LOS ANGELES AREA (El Segundo)
MINNEAPOLIS • NEW YORK AREA (Summit, N.J.) • PHILADELPHIA
AREA (Media) • PITTSBURGH AREA (Mt. Lebanon) • ROCHESTER
ROCKFORD • SAN FRANCISCO AREA (Berkeley) • SEATTLE • ST. LOUIS
TULSA • WASHINGTON • WORCESTER

IN CANADA: Vickers-Sperry of Canada, Ltd., Toronto

XI

This is the eleventh of a series of advertisements dealing with basic facts about alloy steels. Though much of the information is elementary, we believe it will be of interest to many in this field, including men of broad experience who may find it useful to review fundamentals from time to time.

How Alloy Steels Are Affected by Molybdenum

There is nothing hit-or-miss about the making of alloy steels. Each element in a given analysis is chosen for its ability to do a special job—or to complement the abilities of other elements. Previously in this series of discussions we have briefly outlined the functions of nickel and chromium. This leads us naturally to molybdenum, a highly reliable performer in numerous types of analyses.

Because of its many desirable properties, molybdenum is one of the most respected of all the alloying agents. It is often used in conjunction with chromium, manganese, nickel, cobalt, tungsten, vanadium, or various combinations of these elements.

Molybdenum promotes hardenability in steel, and is useful where close hardenability-control is essential. It increases depth-hardness and widens the range of effective heat-treating temperatures. Moreover, it has a strong tendency to form stable carbides that hamper grain-growth prior to quenching, thus making the steel fine-grained and unusually tough at the various hardness levels.

Another point in favor of molybdenum is its ability to increase the tensile and creep strengths of alloy steels at high temperatures. Still another is its talent for enhancing corrosion-resistance in high-chromium and chromium-nickel steels.

Among the familiar products that frequently contain molybdenum are high-speed cutting tools, forged crankshafts and propeller shafts, turbine rotors, high-pressure boiler plate, high-pressure cylinders, permanent magnets, and armor-piercing projectiles. This is by no means intended as a complete list, but rather as a few typical examples.

If you would like more information about the properties and applications of molybdenum, Bethlehem metallurgists will be glad to help you. Our staff technicians have devoted years of research to the subject, and working with molybdenum is part of their job. As a matter of fact, they are specialists in all types of alloying elements, and all types of alloy steels. When they can be of assistance to you, please feel free to call them.

And call on Bethlehem, too, when in the market for AISI standard steels, special-analysis steels, or carbon grades. Your inquiries will be welcomed, and we can assure you of prompt service.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

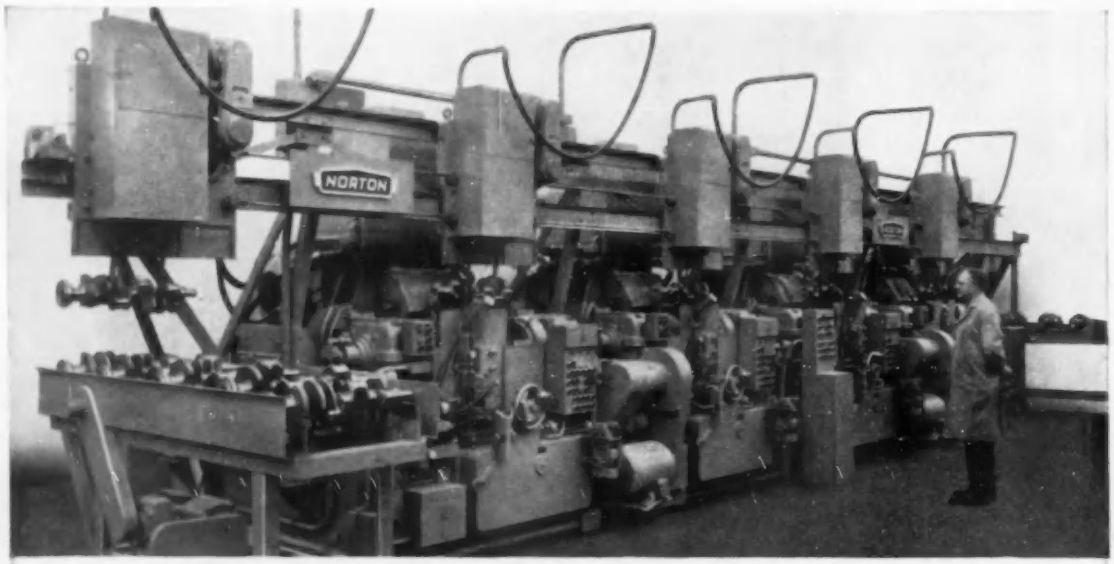
See these Norton machines at the Chicago show

The machines described here will be shown in the Norton exhibit at the Chicago Machine Tool Show — Booth No. 516.

These advanced machines are only a small fraction of the world's largest line. Norton produces a wide range of cylindrical, surface and tool room grinders, lapping machines, crankshaft and camshaft grinders and special types for grinding pistons, valves, jet parts, etc.

Remember, only Norton offers you such long experience in both grinding machines and wheels to bring you the "Touch of Gold" that helps you produce more at lower cost. Why not replace your obsolete grinding and lapping equipment with new Norton machines — and meet competition with the best production tools in the field? See them at the show, call your Norton representative for full details, or write direct.

NORTON COMPANY, Machine Division, Worcester 6, Massachusetts.

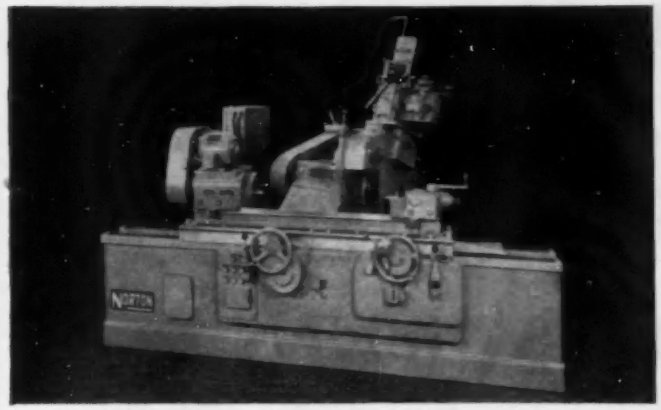


Automation in crankpin grinding . . . another Norton "FIRST"

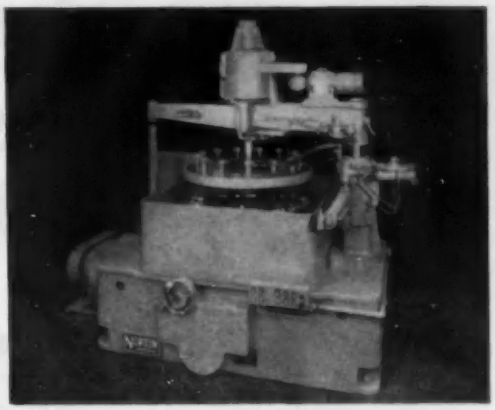
Outstanding in the Norton exhibit at Chicago will be the Automatic Transfer Type Crankpin Grinding Machine. This Norton-engineered advancement grinds pins on automotive type crankshafts completely automatically — eliminating entirely the manual operations of loading, clamping, adjusting, controlling size, gaging and unloading. Savings of time and labor are thus built up for every pin on the shaft.

Movements of the transfer mechanism are electrically controlled, hydraulically operated and completely interlocked to control proper operating sequence.

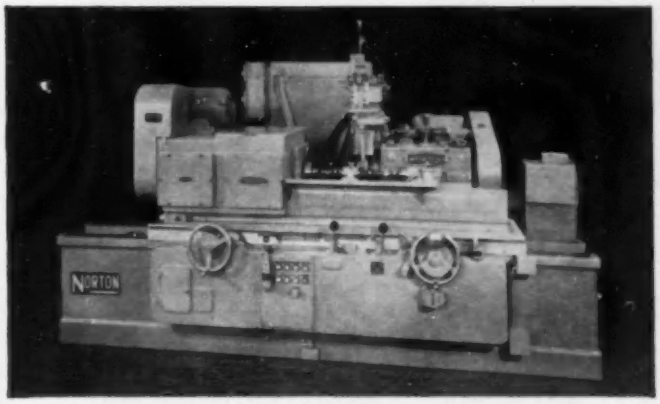
Other Norton automated grinders are on the way. Meet competition with the most economical modernization of grinding methods now available. Norton engineers will gladly discuss complete or partial automation of your grinding operations



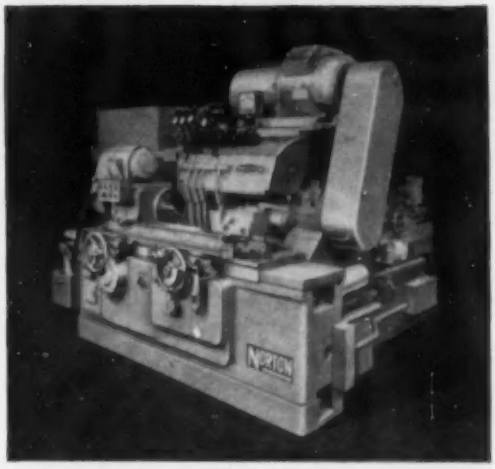
SEMIAUTOMATIC ANGULAR WHEELSLIDE GRINDER — TYPE CV-4. Grinds thrust surfaces and adjacent diameters in one fast automatic plunge grind operation. Eliminates the separate grinds necessary with conventional machines. Operator merely loads, starts automatic cycle, and unloads. Work lengths: 18", 36", 48", 72".



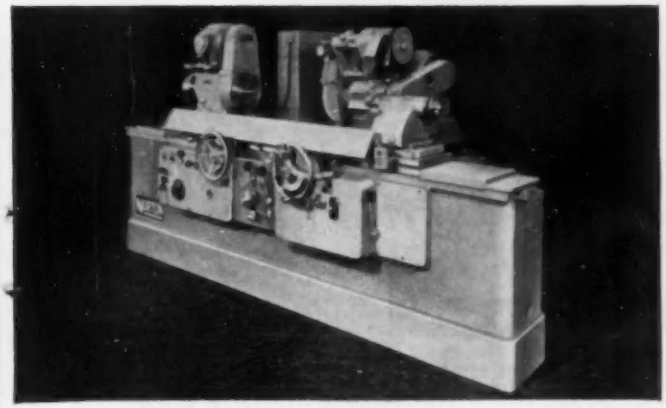
HYPROLAP* HIGH PRODUCTION LAPPING MACHINE NO. 48F. For extremely fast, high production of single or parallel face flat lapping. Bonded abrasive laps produce work pieces free of grit. Arrangements: plain, time cycle . . . automatic continuous feed . . . semiautomatic continuous feed.



CAM-O-MATIC* CAM GRINDER NO. 3. A new, highly advanced automatic machine that sets new standards for production, precision and finish. Solid construction cuts vibration, assures maximum accuracy and service life. Entire operating cycle is geared to split-second efficiency. Capacity for taper-face grinding gives added versatility.



HEAVY DUTY MULTI-WHEEL GRINDER — TYPE CM-1. Makes four or more cuts simultaneously in a single plunge-grind cycle. Operates automatically, under one-lever control. Brings new economy to the grinding of multi-diameter parts such as crank and camshafts, etc. In 10" x 30" and 14" x 30" sizes.



12" UNIVERSAL GRINDER — TYPE U-4. Quick, easy set-ups plus fast grinding action over a wide variety of external, internal, face and angular wheelslide grinding jobs. Permanent chuck mounting is one of many advanced features. Work lengths: 36" and 48".

Also shown at Chicago will be the Norton 10" Semiautomatic Cylindrical Grinder — Type CTU. Designed for plunge or traverse type operations, from rough cuts to finest finishing. Production and job shop users report one Type CTU replaces several other machines.

*Trade-Marks Reg. U. S. Pat. Off. and Foreign Countries

To Economize, Modernize with NEW

NORTON

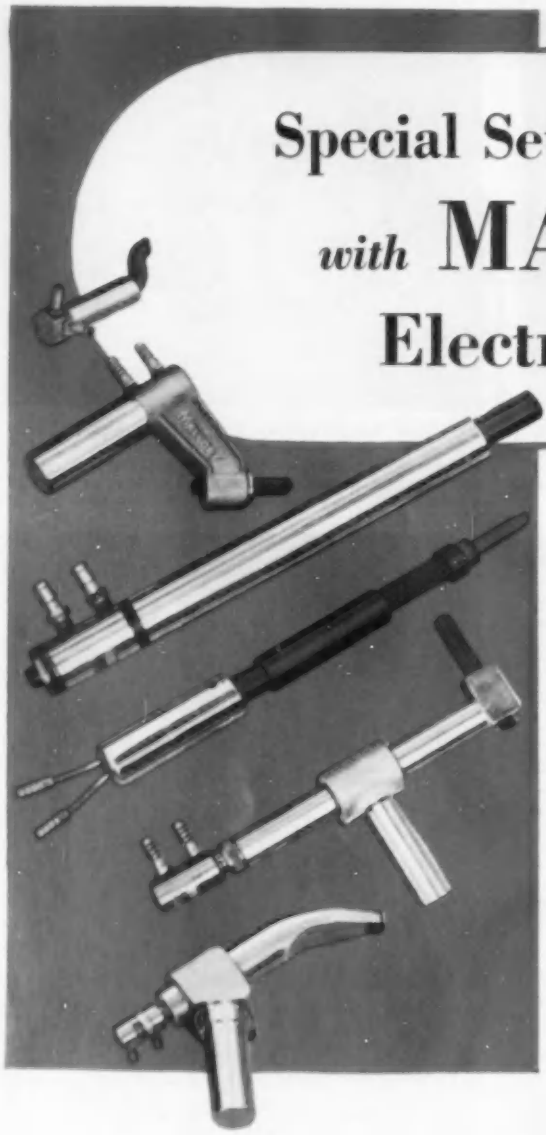
GRINDERS and LAPPERS

Making better products... to make your products better

District Sales Offices: Worcester • Hartford • New York Area, Teterboro, New Jersey • Cleveland • Chicago • Detroit

In Canada: J. H. Ryder Machinery Co., Ltd., Toronto 5.

Special Set-Ups Made Easy...
with MALLORY
Electrode Holders



BEFORE you go to the time and expense of getting a custom-made holder for a welding job, take a look at the variety of standard Mallory Electrode Holders. You can probably pick out the design your application requires ... at substantial savings in cost and delivery.

The most complete line in the industry, Mallory Electrode Holders offer many varied designs ... straight, offset, paddle type, swivel head, low inertia, universal and close-coupled. Light, standard and heavy-duty models are available for pressure ranges from under 100 lbs. to more than 6000 lbs.

By using these versatile holders in combination with the hundreds of different types of Mallory welding electrodes, you can assemble an almost unlimited variety of welding set-ups. Most welds in channels, or other hard-to-reach locations can be made with standard Mallory welding parts. And when your application poses problems outside of the range of standard models, Mallory engineers are well qualified to design special holders and electrodes for your individual needs.

Look through the Mallory Resistance Welding Catalog and pick out a series of holders that will equip your shop for the range of work you are doing. Your nearby Mallory distributor will be glad to give you a copy of this useful catalog and to help in your selection ... or you can get one by writing direct to Mallory.

Expect more...
Get more from

P. R. MALLORY & CO. Inc.
MALLORY
P. R. MALLORY & CO., Inc., INDIANAPOLIS 6, INDIANA

In Canada, made and sold by Johnson Matthey and Mallory, Ltd., 110 Industry Street, Toronto 15, Ontario

STOCK ELECTRODES

Hundreds of shapes and sizes are available in stock ... with round water holes or the exclusive Mallory fluted cooling hole for longer life between dressings. Save you both in cost and delivery time.

STANDARD ELECTRODES

Odd-shaped electrodes you consider "specials" may well be standard items for Mallory ... can be made quickly with existing tools, in a wide range of single-bend, double-bend and irregular shapes.

For information on titanium developments, contact Mallory-Sharon Titanium Corp., Niles, Ohio

Interested in better stampings?

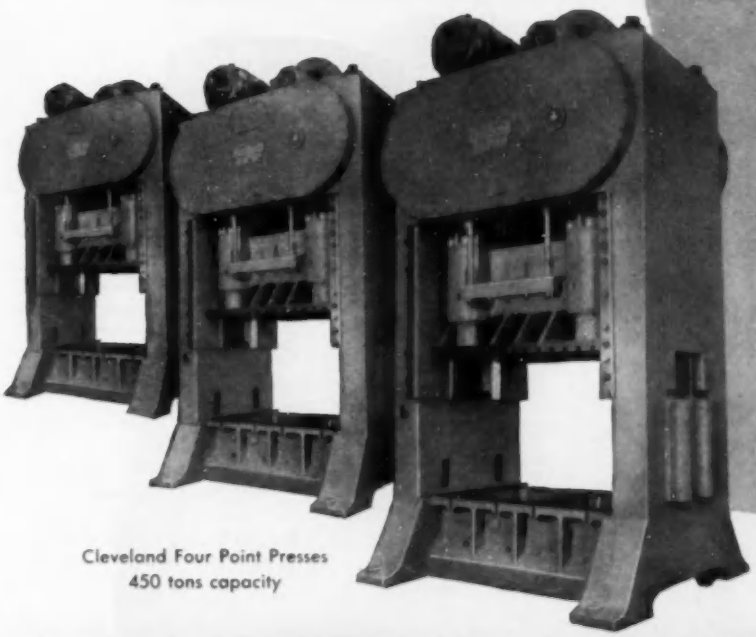
Lower costs?

LINE UP with CLEVELANDS!

You can easily select the exact type and size press for top efficiency on any stamping job from Cleveland's complete line.

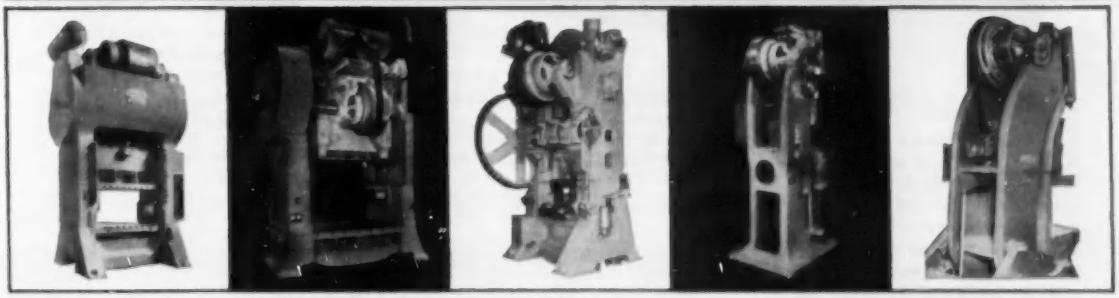
The trouble-free Cleveland Drum Type Clutch gives you positive, instantaneous slide control. Its greater accuracy means fewer rejects. Lightweight and easy to maintain, it cuts press operating costs.

Make your new presses Clevelands. A Cleveland engineer will gladly help you choose the right model Clevelands for economical press production.



Cleveland Four Point Presses
450 tons capacity

IF YOU WANT STAMPING ECONOMY, BUY CLEVELANDS POWERED BY THE CLUTCH THAT'S "REVOLUTIONIZING" PRESS PRODUCTION



TWO POINT TWIN DRIVE | TWO POINT SINGLE END DRIVE | KNUCKLE JOINT | NORMING | INCLINABLE

1880 75 1955 YEARS OF CONSTANT PROGRESS
Diamond Anniversary

THE CLEVELAND PUNCH & SHEAR WORKS CO.

Established 1880

POWER PRESSES
FABRICATING TOOLS

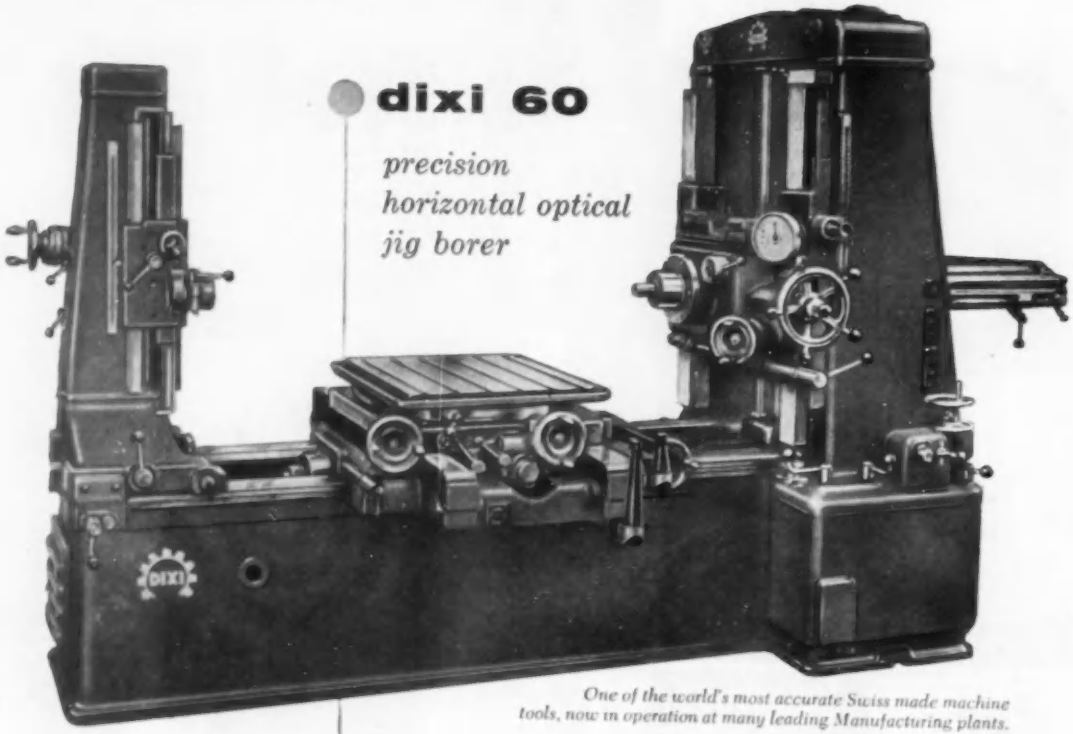
E. 40TH & ST. CLAIR AVENUE • CLEVELAND 14, OHIO

Offices at: NEW YORK • CHICAGO • DETROIT • PHILADELPHIA • E. LANSING • OXFORD, O.

CITY FOUNDRY DIVISION • SMALL TOOL DEPARTMENT

machine tools

precision built for . . .



dixi 60

precision
horizontal optical
jig borer

One of the world's most accurate Swiss made machine tools, now in operation at many leading Manufacturing plants.

outstanding features:

A precision machine for drilling, boring, recessing, and milling work. Table can be rotated to 360 degrees. Accurate automatic locking of rotary table every 15 degrees, and at any other position by hand. Table and spindlehead have variable hydraulic feed. All coordinate dimensions can be set by dials, and adjustment made through optical microscopes. Mechanical spindle feed can be changed without stopping machine. Automatic stop of spindle feed. Optical measuring system operates in conjunction with vernier scales.

Headstock, column, and table settings by optical microscopes to insure overall accuracy of .0002". Built in rotary table with optical microscope. Table size 28¾" x 32⅝". Max. distance table to spindle 19.7". Table travel, 23⅝". Hydraulic feeds for all functions 0-78" per min. #40 Taper spindle. Spindle travel 24.4". Spindle speeds 32-1350 R.P.M. Feeds .0015"-.010" per rev.

M.B.I.

export and import ltd.

A Division of Machinery Builders Inc.

475 Grand Concourse, Bronx 51, New York

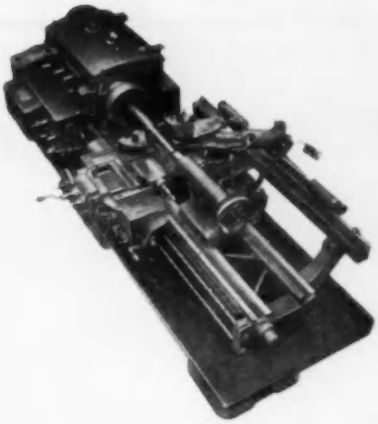
economy reliability | accuracy versatility

- Guaranteed service by Trained Staff
- Spare Parts in Stock
- Early Deliveries — Some from Stock
- Your Operators Trained
- Competitive Prices
- Engineering Staff will make recommendations based on your drawings

Also United States distributors of low cost multi purpose vises. Tapping attachments. Quick change chucks and collets. Willie-Grip Keyless drillchucks. Milling machine arbors, adapters, arbor spaces and bearings. Lathe mandrels.

Modern machine tools for every purpose. Built by reputable, old established European Machine Tool Builders to meet the requirements of America's Age of Automation.

Dealerships Available Certain States



High Precision, Reliability, Top Performance

Schaerer Model UN-450 Heavy Duty Copying Lathes

Twin cross slides. Copies from cylindrical or flat template either longitudinally or cross. Twin slides permits rough turning and finish turning in the same operation in many instances. Swings 17¾" over bed, 9" over carriage, 20-5/64" over gap. Center distance 60". Spindle speeds 31.5 to 1400 R.P.M. Hydraulic copying attachment can be removed to permit use as a regular twin slide lathe when necessary. 10 H.P. motor drive to spindle. Separate motors for coolant and hydraulic pump. A production lathe built to tool room standards.

See these machines in actual operation at the METALWORKING MACHINERY & EQUIPMENT EXHIBITION

CHICAGO COLISEUM
SEPT. 6 TO 17
BOOTH 754

Over twenty years experience in designing and building machinery

Our Headquarters in New York City

Girards Radial Drills

Seven Sizes from 3' arm x 11¾" column to 10' arm x 25½" column. 3' and 4' arm machines have 12 spindle speeds from 32-1400 R.P.M. and 6 feeds from .0015" to .040" with #4MT Spindles. Larger machines have 21 spindle speeds from 14-1400 R.P.M. and 12 feeds from .0008" to .080" with #5MT Spindle and 7.5 H.P. Spindle Motor.

MBI

NEW BRITAIN

Automatics

See the newest approaches to

Automatic Bar and Chucking Machines; Precision Boring Machines; Copying Lathes; Horizontal Boring, Drilling, and Milling Machines.

The NEW BRITAIN MACHINE COMPANY

LUCAS
of Cleveland

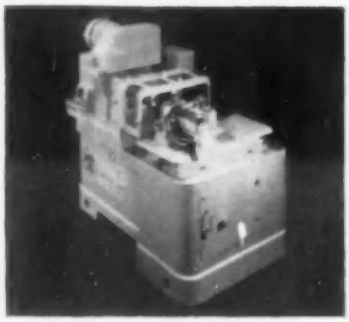
more profitable metalworking

BOOTH 1419

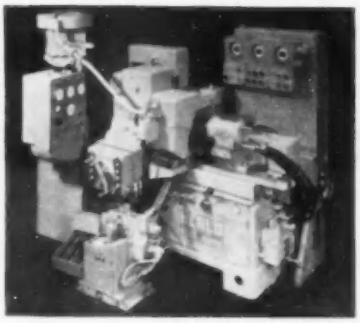
THE MACHINE TOOL SHOW
CHICAGO, ILL.
SEPT. 6-17, 1955
INTERNATIONAL AMPHITHEATRE

New Britain-Gridley Machine Division, New Britain, Connecticut
Lucas Machine Division, Cleveland 8, Ohio

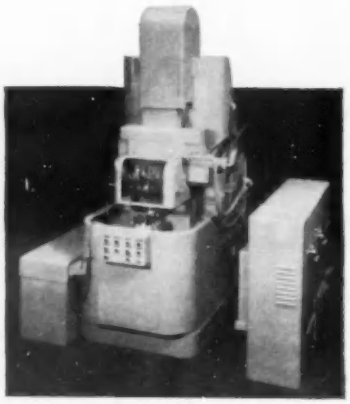
HEALD presents seven of the



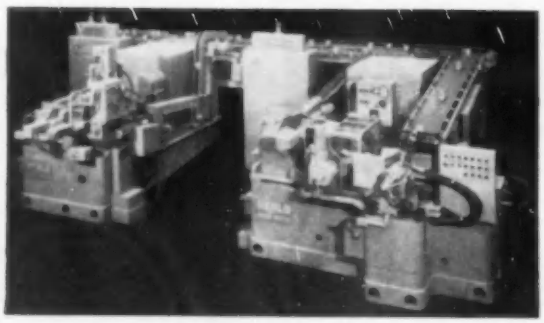
Model 2 Cam-Operated Bore-Matic
All-mechanical cam operation makes its debut as an alternate to the hydraulic system on a high-precision Heald Bore-Matic. This new machine, for handling small to medium-size work, demonstrates high productivity by finishing all surfaces of gear blanks in a single, high-speed, fully automatic cycle. Entire cam unit swings out of base for easy access or replacement of cams. Bulletin 2-2215-1.



Model 170 Size-Matic
A high-production, auto-chucking internal grinding machine with hopper feed and automatic after-gaging and feedback. New feedback system transmits gaging results back to the new rotary diamond unit, automatically compensating for any in-cycle deviations from required tolerance. Provision for automatic sorting also included. Bulletin 2-170-1.



Model S Vertical Bore-Matic
Vertical arrangement of tool-slide unit conserves floor space and facilitates loading and clamping of work in a horizontal position. Multiple slide units, approaching work from various directions, can be supplied as required for a particular type of work, and either work or tooling can be rotated. Ideally suited to automated production set-ups. Bulletin 2-25-3.



Automated Slide Unit Bore-Matic
A completely automated set-up of two individual machines with automatic conveying, orienting, locating, clamping, borizing, unloading, flushing, gaging and sorting. Machine is arranged for continuous production of automotive pistons, boring pin holes and elliptical box turning in sequential operations at the two stations. Bulletin 2-25-3.

new stars
Machine Tool Show

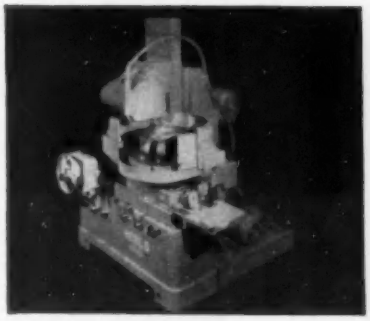
...with a supporting cast of important new developments in precision finishing

The sixteen Heald machines on display in Booth 902 at the N.M.T.B.A. Show represent the very latest advances in modern precision-finishing methods and equipment.

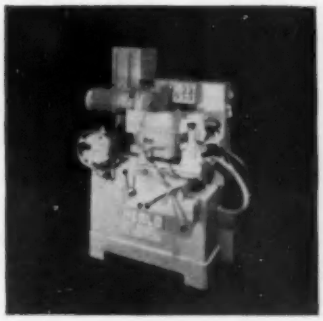
The seven machines shown below are *completely new* in basic design or important functional details. Hence they are, in effect, the "stars" of the Heald exhibit.

The other Show machines however, also demonstrate *important new developments* that will contribute materially to higher precision and faster, better production. Included are new and more effective sizing methods for internal grinding—self-adjusting cycles—automatic after-gaging and sorting—new Feed-Out quills—new workholding methods on Centri-Matic machines—skip compensation and dressing—simultaneous bore and face grinding—plus many new applications of standard or semi-standard machines.

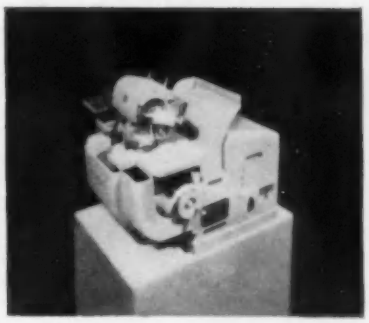
If you were unable to get to the Show, be sure to have your Heald representative bring you up-to-date on these latest developments. Full details on the new machines shown below can be obtained by sending for the Bulletins listed.



Model 361 Rotary Surface Grinder
New "king size" column-type rotary for high-precision surface grinding of larger work than could heretofore be handled on a standard Heald machine. Features and construction details essentially same as Model 261 Rotary, with modifications to accommodate a 24" chuck and 17½" vertical capacity from top of chuck to center of wheel. Wheelhead drive motor is mounted on vertical column equipped with plain bearing slide. Bulletin 2-361-1.



Model 161 Rotary Surface Grinder
Completely new column rotary, mechanically operated and designed for maximum precision and economy in grinding relatively small parts. New mechanical load and fire type reversal simplifies construction and reduces servicing requirements. With a 6" chuck and 10" vertical clearance to center of wheel, it offers full flexibility for a wide variety of parts within its size range. Bulletin 2-161-1.



Model 3 Tool Sharpening Machine
A new model incorporating advanced design features for faster, easier sharpening of carbide tipped cutting tools. Permits precision duplication of any desired tool shape for optimum cutting efficiency and maximum tool life. Includes positive drive reciprocation and more effective enclosed mechanical operating unit for spindle and tool holder drive. Bulletin 2-4-2.

Now, more than ever before,
it PAYS to come to Heald

THE **HEALD** MACHINE COMPANY
Worcester 6, Massachusetts
Branch Offices: Chicago • Cleveland • Dayton • Detroit • Indianapolis • New York

HEALD

New High-Torque Unbrako self-locking socket set screws

set them, forget them—they stay tight

Up to 40% higher tightening torque—a new Unbrako feature

RECOMMENDED SOCKET SET SCREW TIGHTENING TORQUES (Inch-Pounds)

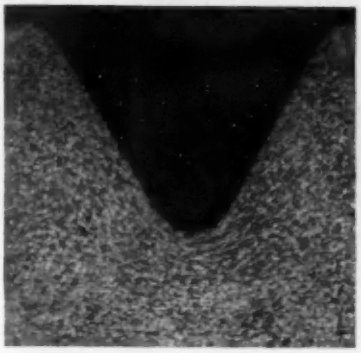
SCREW SIZE	UNBRAKO	B	C	MINIMUM DIFFERENTIAL %
#4	5	3.9	3.5	28
#5	9	7.8	7.4	15
#6	9	7.8	7.4	15
#8	20	14.7	14.5	36
#10	33	26.5	25	25
1/4	87	62	60	40
5/16	165	122	125	32
3/8	290	198	225	29
7/16	430	309	350	23
1/2	620	460	500	24
5/8	1225	1106	1060	11
3/4	2125	1540	1800	18
7/8	5000	3660	4600	9
1	7000	5025	6500	8

All UNBRAKOS can withstand higher tightening torques than ordinary set screws. For example, the recommended torque for a ¼" UNBRAKO is 87 inch-pounds —40% greater than that recommended for an ordinary set screw.

Research has proved that the tighter you seat a set screw the better it works. We went to work to design a socket set screw that could be tightened tighter than ever before without damaging the screw.

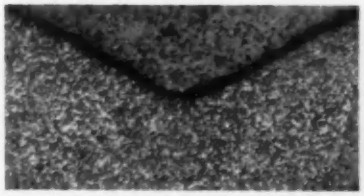
We formed a deeper socket. We put a radius in the socket corners. We developed fully formed threads. We established new methods of heat treatment in atmosphere-controlled furnaces. It took almost 6 years' research and development, but the new High-Torque UNBRAKO incorporates all of these improvements. And it retains the self-locking knurled cup point that keeps an UNBRAKO tight up to 48 times as long as a plain cup point set screw, regardless of the size of the point or the cup.

UNBRAKO SET SCREW



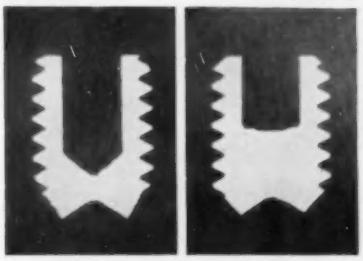
We fully form the threads—make the whole screw stronger. The metal is compressed into the closely knit grain structure that you see in this illustration. The grain flow follows the contour of the threads. There are no straight lines along which shear can occur. The UNBRAKO retains its flow lines even when ground down to .010" below root diameter. Screws with cut or ground threads lose thread form at root diameter.

UNBRAKO SET SCREW



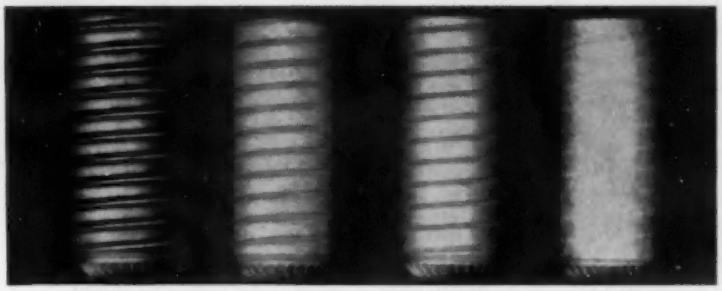
We put a radius in the socket corners—eliminate the sharp corners where cracks start. This distributes the stresses developed when tightening torques are applied. Ordinary socket screws have sharp corners which often crack when tightened even at lower recommended torques.

UNBRAKO SET SCREW | ORDINARY SET SCREW

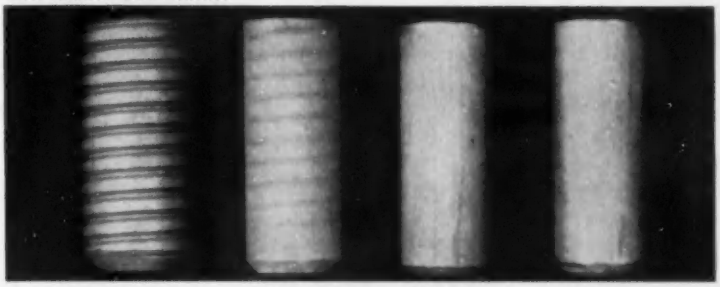


We form a deeper socket—give you more purchase with the wrench. Since more wrench can be put into the UNBRAKO socket, you can set the screw much tighter. And you won't ream the socket or round the corners of the wrench.

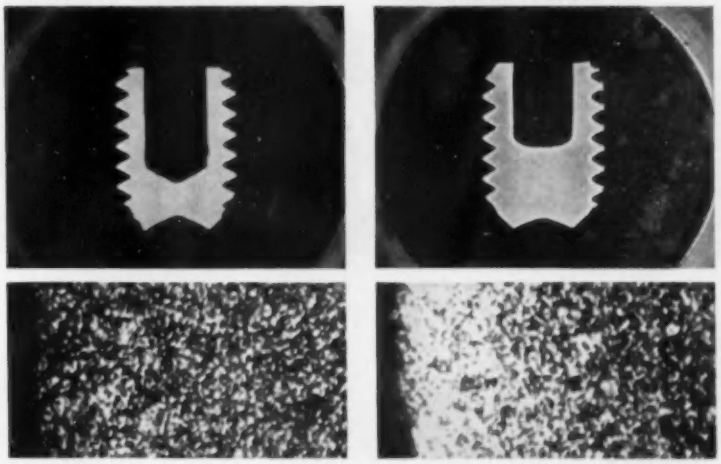
UNBRAKO SET SCREW



ORDINARY SET SCREW



UNBRAKO SET SCREW | ORDINARY SET SCREW



We heat treat an UNBRAKO properly. It's a ticklish job to heat treat a socket set screw. If you don't do it just right, you get decarburization. And decarb plays havoc with a screw. Put a wrench in the socket and you ream it. Run the screw into a tapped hole and you strip its threads. Try to seat the screw and its point shears off. These photos show the good and the bad. The UNBRAKO is clean. Its grain structure is uniform. There is no decarburization—the ordinary screw is suffering from an overdose of it, socket walls, threads and point are full of the telltale white spots.

You can't buy another set screw as good as an UNBRAKO. See your authorized industrial distributor today. Or write STANDARD PRESSED STEEL CO., Jenkintown 53, Pa.

Visit Booth 828 at the Production Engineering Show—
see the new UNBRAKO High-Torque Socket Set Screw demonstrated

UNBRAKO SOCKET SCREW DIVISION SPS JENKINTOWN, PENNSYLVANIA

See Cincinnati

SHAPERS . . . SHEARS . . . PRESS BRAKES

—in ACTION

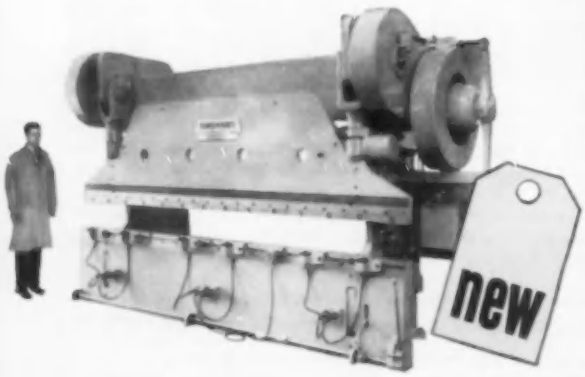
at THE MACHINE TOOL SHOW

INTERNATIONAL AMPHITHEATRE—CHICAGO, ILL.
SEPTEMBER 6–17

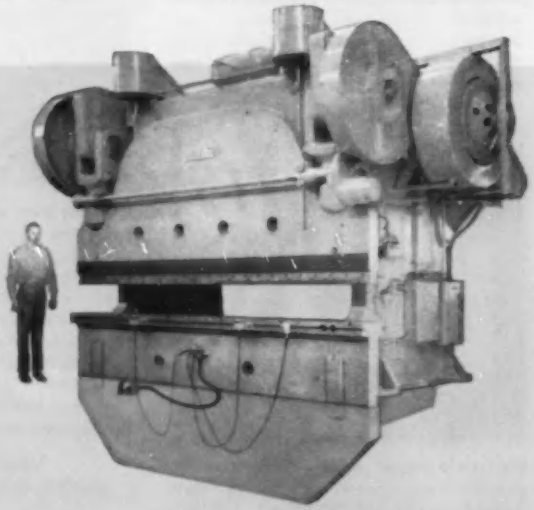
BOOTH 1105

THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A. SHAPERS • SHEARS • BRAKES



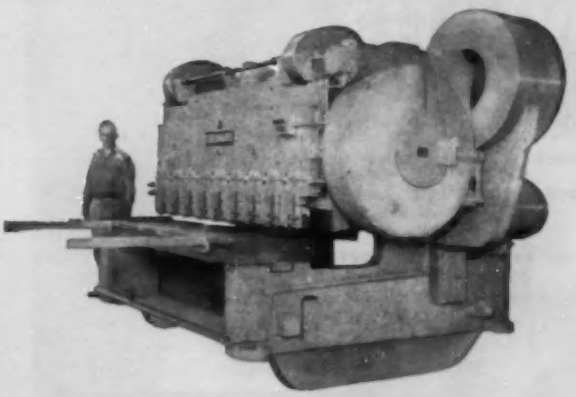
9-115 x 10′ CINCINNATI ALL STEEL PRESS BRAKE, capacity 1 4″ x 10′ mild steel.



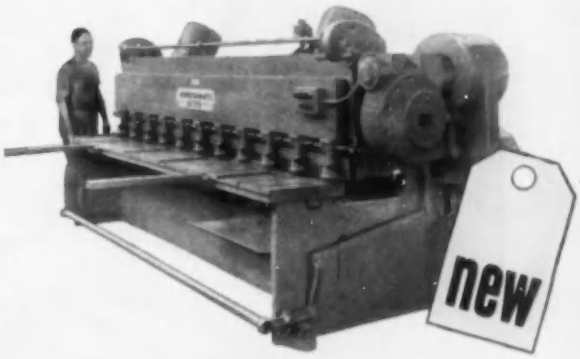
50-900 x 12′ CINCINNATI ALL STEEL PRESS BRAKE, capacity 1″ x 12′ mild steel.

42" CINCINNATI ALL STEEL SHAPER, 16 cutting speeds, 25 to 400 FPM.

16" HEAVY DUTY CINCINNATI RIGID UNIVERSAL SHAPER.



10008 CINCINNATI ALL STEEL SHEAR, capacity 1" x 8' mild steel.



1410 CINCINNATI ALL STEEL SHEAR, capacity 3/16" x 10' mild steel.

2-30 x 5' CINCINNATI ALL STEEL PRESS BRAKE, capacity 30 ton or 14 gauge x 6' mild steel.

3-50 x 6' CINCINNATI ALL STEEL PRESS BRAKE, capacity 50 ton or 10 gauge x 6' mild steel.

NEW

Automation in Drilling at Low Cost

ARO

AUTOMATIC and PAR-A-MATIC DRILLS

Increased production . . . higher quality . . . fewer man hours! Controlled air and hydraulic feed . . . rapid traverse adjustment . . . adjustable stroke length . . . use singly or in combinations. Write for bulletin 5546-T on Automatic and Par-A-Matic Drills.

THE ARO EQUIPMENT CORPORATION
Bryan and Cleveland, Ohio
Aro Equipment of California, Los Angeles, Calif.
Aro Equipment of Canada, Ltd.,
Toronto 15, Ontario
Offices in All Principal Cities

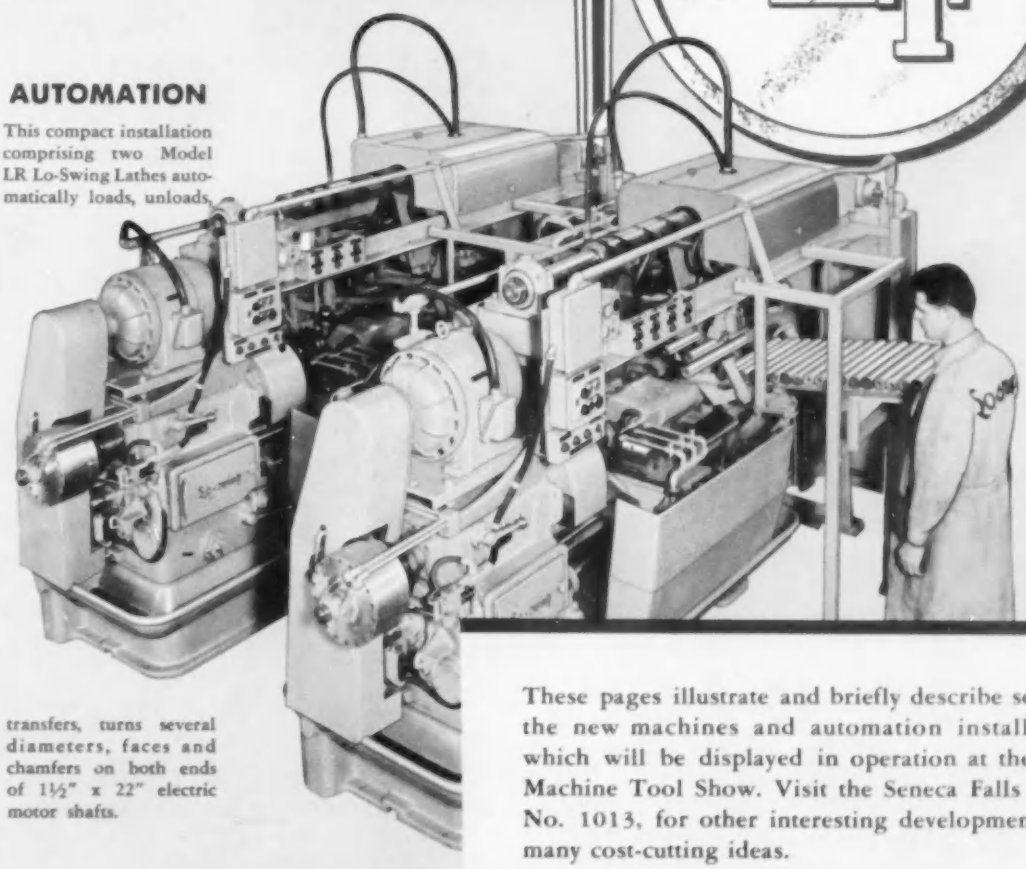
ARO

AIR TOOLS

Also . . . Air Hoists . . . Lubricating Equipment . . . Aircraft Products . . . Grease Fittings

Lo-swing

MACHINES AT THE SHOW



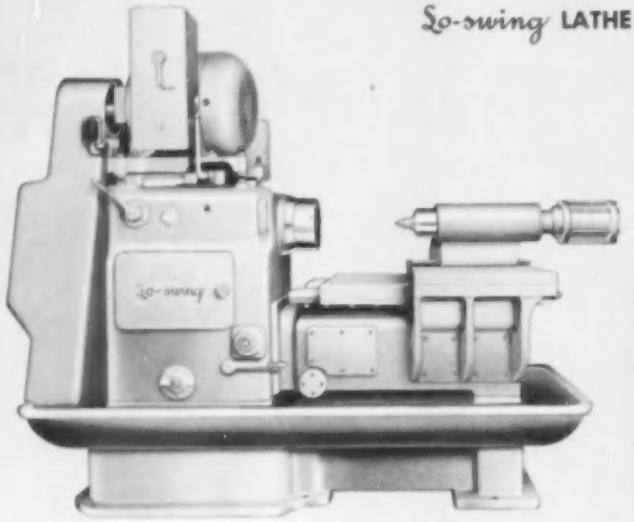
AUTOMATION

This compact installation comprising two Model LR Lo-Swing Lathes automatically loads, unloads, transfers, turns several diameters, faces and chamfers on both ends of 1½" x 22" electric motor shafts.

These pages illustrate and briefly describe some of the new machines and automation installations which will be displayed in operation at the 1955 Machine Tool Show. Visit the Seneca Falls booth, No. 1013, for other interesting developments and many cost-cutting ideas.

MODEL LN PLATEN TYPE AUTOMATIC

Lo-swing LATHE



A fully-automatic, cam-operated lathe designed principally as a chucking machine adaptable to a wide variety of work requiring large swing capacity, high spindle speeds, multiple tooling and fast cycle operation. Its design, however, permits mounting an air-operated tailstock on a bridge which joins the front and rear sections of the bed, without obstructing movement of the platen. The tailstock provides additional support for long parts extending some distance from the chuck.

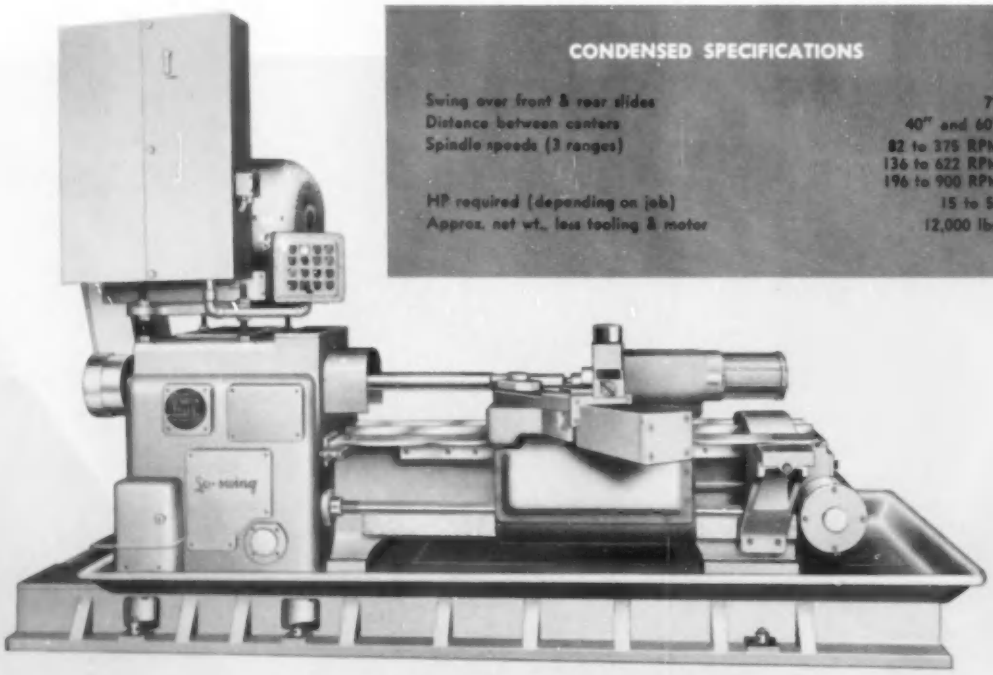
CONDENSED SPECIFICATIONS

Swing, over bed ways	24½"
over platen	18½"
Maximum dia. of chuck, over platen	18"
Spindle speeds (3 ranges)	60 to 406 RPM
	146 to 980 RPM
	308 to 2080 RPM
Feed per revolution of spindle	.003" to .024"
HP required (depending on job)	7½ to 20
Approx. net wt., less tooling & motor	5,200 lbs.

A modern, fully-automatic, high speed machine which can be easily set up and operated by semi-skilled labor. Recommended for machining shafts in small or medium lots, using a simple type of master template to reproduce size and profile. Operator pushes starting button and tracer-controlled tool rough turns, then finish turns, carriage returns to starting position and spindle stops. Longitudinal feed is by rack and pinion, providing unlimited carriage travel. Fully-automatic Back Squaring Attachments, with synchronized feed cycle, are available for facing and undercutting operations.

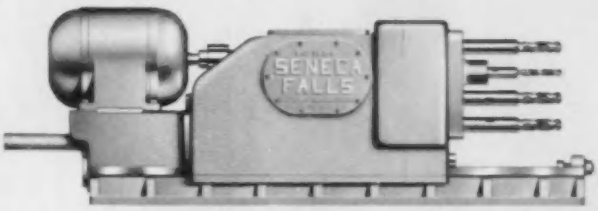
CONDENSED SPECIFICATIONS

Swing over front & rear slides	7"
Distance between centers	40" and 60"
Spindle speeds (3 ranges)	82 to 375 RPM
	136 to 622 RPM
	196 to 900 RPM
HP required (depending on job)	15 to 50
Approx. net wt., less tooling & motor	12,000 lbs.



MODEL AP TRACER TYPE *Lo-swing* LATHE

MODEL WD WAYDRILL PRODUCTION UNIT



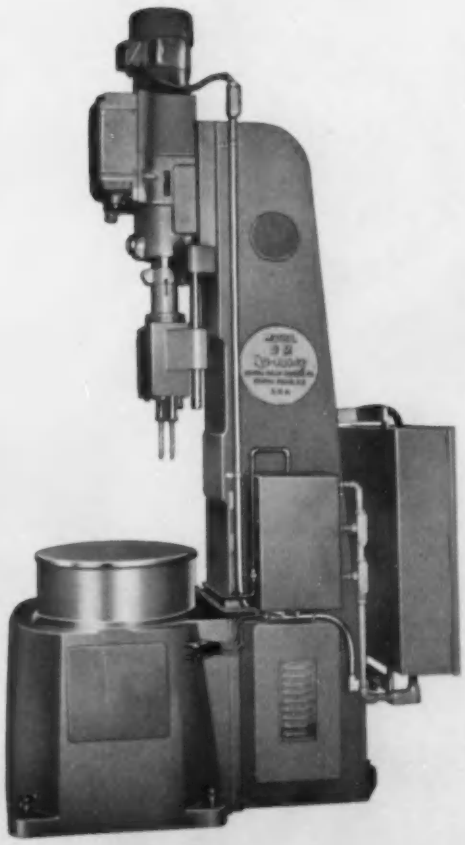
A completely self-contained, simple yet rigid unit operating from a single motor. May be grouped together for any drilling, boring, reaming, counterboring and tapping operations and will operate at any angle. Feed movements are through a lead screw, so arranged as to permit intermittent feeding and rapid traverse during the stroke of the drilling head, thereby reducing machining time on work involving intermittent cutting. The drilling head is cushioned at the end of the stroke to prevent "break through" of the drills. Feed and rapid traverse movements are automatically controlled by adjustable stops. Lubrication is completely automatic. Available attachments permit two rates of drilling feed, desirable when counterboring takes place at the end of the feed cycle. Another attachment permits counterbores to "dwell" for a certain number of revolutions at the end of the cut.

CONDENSED SPECIFICATIONS

Standard speed range,	
with 1150 RPM motor	130 to 1150 RPM
with 1750 RPM motor	200 to 1750 RPM
Standard drilling feed	.004" to .017"
Special drilling feed	.001" to .050"
Rapid traverse, inches per min.	300
Maximum thrust	11,000 lbs.
Maximum feed stroke, width & height	16"
Drilling area of head	20" x 19"
Maximum frame size of motor	NEMA 326
Overall dimensions	20" x 74" x 33¼" high

MODEL DM AUTOMATIC DRILLING AND REAMING MACHINE

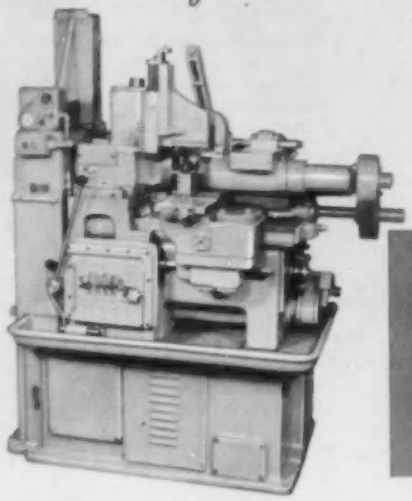
The Seneca Falls Model DM is made from standardized units assembled on a base casting or welded platform. The machine may be composed of one or several drilling heads which in turn may be equipped with single or cluster drilling spindles. The base may be fitted with an automatic indexing fixture to rotate work pieces through a series of stations under the drilling, reaming or tapping spindles. Work pieces are loaded in suitable holding fixtures, and when automatically loaded, two stations on the indexing table are reserved for loading and unloading. A fully-automatic cycle can be utilized, including automatic "pick-up" from a conveyor line, automatic loading, machining and indexing, and finally, automatic ejection of the finished part on another conveyor line.



CONDENSED SPECIFICATIONS

Height of machine	110"
Feed of head, maximum	16"
Drilling area of head	20" x 19"
Diameter of indexing table	28"
Spindle speeds	130 to 1150 or 200 to 1750 RPM
Head drive motors	Depends on work piece
Number of spindles	Depends on work piece

AUTOMATED *Lo-swing* IMP



A Rotary-type Automatic Loader assures a constant flow of pump gears through this lathe, which turns, faces, and chamfers, on a complete automatic cycle. Gears are placed in the loading chute and feed by gravity to openings in the Rotary Loader, which indexes them to proper position. Revolving spindles, which are withdrawn during the indexing phase, then pick them up for machining. The fast revolving gears are completely stationary when they reach the discharge chute.

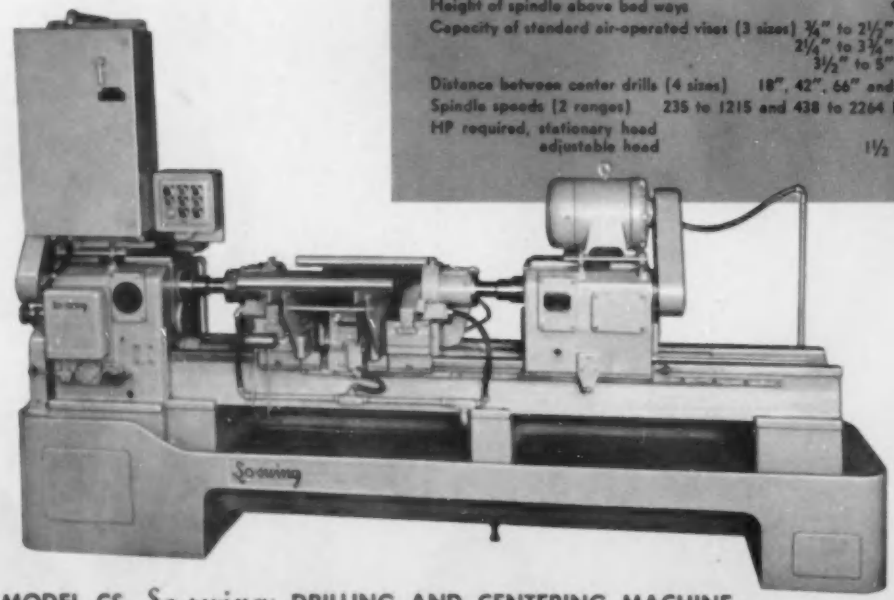
SPECIFICATIONS OF LO-SWING IMP

Swing over front & rear slides	4½"
Distance between centers (2 sizes)	8" or 12"
Spindle speeds (3 ranges)	400 to 1750 RPM 800 to 3500 RPM 1020 to 4500 RPM
HP required (depending on job)	3 to 5
Approx. net wt., less tooling & motor	4,000 lbs.

A "Walking Beam" type of Loader and special vises equip this Centering Machine for completely automatic operation. Shafts arrive by conveyor and roll to a fixed stop on the loading rails. The loader has two work carrier arms which operate with a rotating movement and handle both rough and finished pieces simultaneously. As the unloading arms remove and eject a finished piece, the loader arms, in their trajectory, pick up a rough piece and lower it into the vise jaws. It is then automatically clamped in position, the feed starting clutch engages and the shaft is centered. At the end of the feed cycle, the center drills retract and the vises open.

SPECIFICATIONS OF MODEL CS LO-SWING

Height of spindle above bed ways	9¼"
Capacity of standard air-operated vises (3 sizes)	¾" to 2½" dia. 2¼" to 3¾" dia. 3½" to 5" dia.
Distance between center drills (4 sizes)	18", 42", 66" and 90"
Spindle speeds (2 ranges)	235 to 1215 and 438 to 2264 RPM
HP required, stationary head	3
adjustable head	1½ to 3



AUTOMATED MODEL CS *Lo-swing* DRILLING AND CENTERING MACHINE

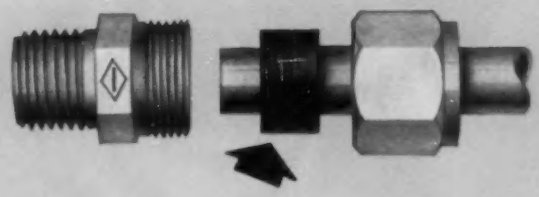
SENECA FALLS MACHINE CO.

SENECA FALLS, N. Y.

LITHO. IN U.S.A.

The Fitting that Never Gets Tired of Absorbing Shocks and Vibration!

IMPERIAL FLEX FITTINGS ... Make Tube Fitting Failures Unnecessary

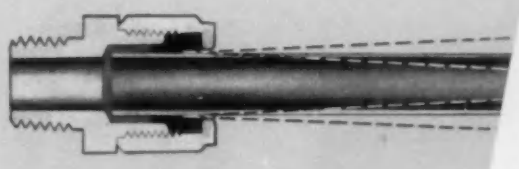


Every Flex Fitting embodies this vibration and shock absorbing sleeve.

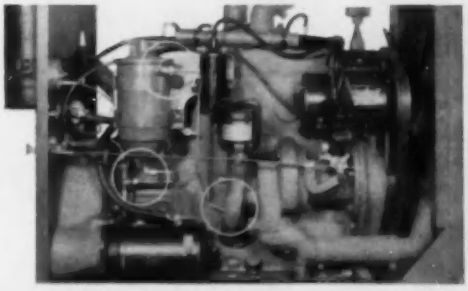
FLEX FITTINGS make safer joints that are virtually indestructible by vibration . . . absorb shock and minor tube movement . . . assure a positive pressure-tight seal.

FLEX FITTINGS are very easy to install . . . simply slip nut and Flex sleeve over tubing . . . insert tubing into body and tighten nut — that's all!

FLEX FITTINGS can be used with all kinds of tubing

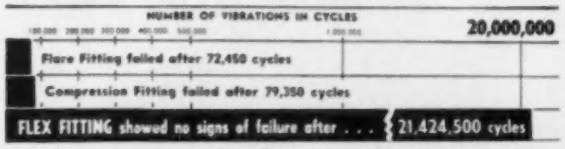


The Flex Fitting actually permits the tube to flex back and forth through angle shown. Note that tubing is cushioned against any damage.



If you have a tough tubing connection job that involves vibration, shock or tube movement, it will pay you to consider IMPERIAL FLEX FITTINGS. Whether it's tractors, diesels, heavy power equipment, machinery or earth movers, you will be safe with FLEX FITTINGS. Thoroughly proved by extensive use.

Comparative Vibration Test Results


NUMBER OF VIBRATIONS IN CYCLES
20,000,000
Flare Fitting failed after 72,450 cycles
Compression Fitting failed after 79,350 cycles
FLEX FITTING showed no signs of failure after . . .
21,424,500 cycles

On vibration tests, where other fittings failed quickly, Flex Fittings withstood over 20,000,000 cycles without sign of failure.

Ask for Catalog 344

THE IMPERIAL BRASS MANUFACTURING COMPANY

1241 W. Harrison St., Chicago 7, Ill.

In Canada: 334 Lauder Ave., Toronto, Ontario

IMPERIAL

Pioneers in Tube Fittings and Tube Working Tools

LITHO. IN U.S.A.

metalworking history will be made by

NIAGARA PRESSES, PRESS BRAKES

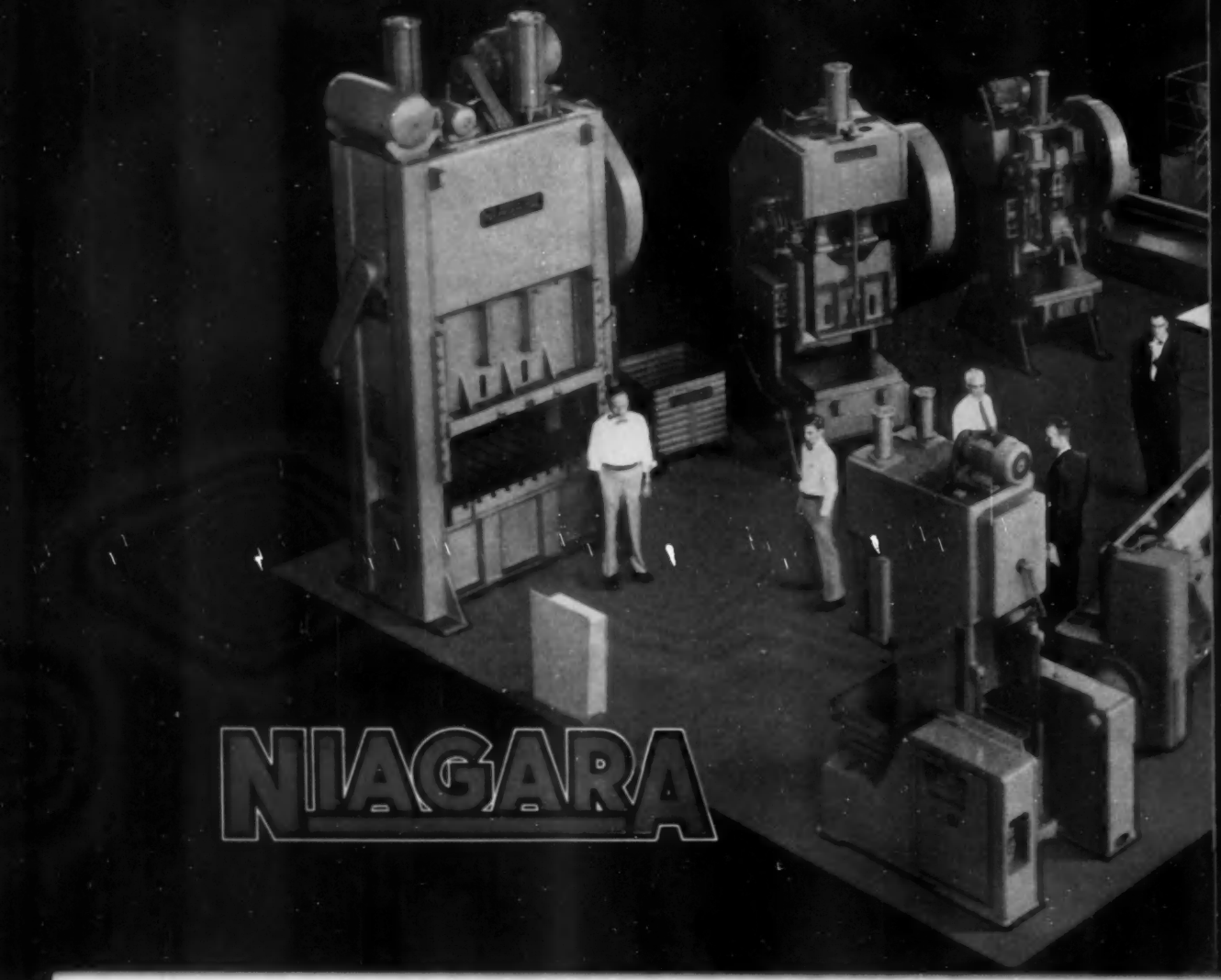
in action!

Watch them operate. Examine them. See a revolution in metalworking with these modern wonders in action. You'll be electrified by brand new machines never before exhibited, stirring new developments on conventional machines and engineering marvels in press automation.

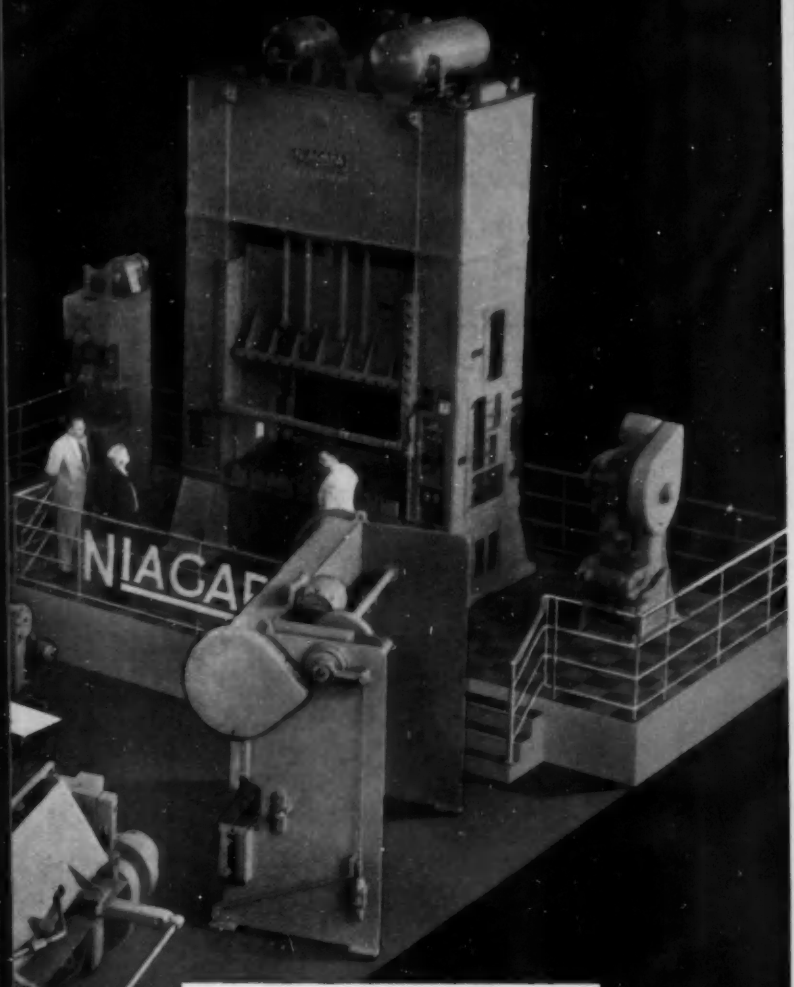
Truly, Niagara promises you the greatest demonstration of the word "New" in the whole Machine Tool Show.

And everybody — yes, everybody — top management and all — will be on hand to give you a warm greeting and a full explanation of anything you wish to know about history-making Niagara machines. Come early, while you're fresh. There's so much to see!

NIAGARA MACHINE & TOOL WORKS • BUFFALO 11, N. Y.



AND SHEARS



MAIN EVENT
Booth No. 715

THE MACHINE TOOL SHOW
CHICAGO, ILL.
SEPT. 8-17, 1959
INTERNATIONAL AMPHITHEATRE

NEW DESIGNS

NEW LINES

NEW COMPACTNESS

NEW STAMINA

NEW ECONOMIES

NEW ACCURACY

NEW OPERATING EASE

NEW SAFETY

NEW CAPACITIES

NEW PRODUCTIVITY

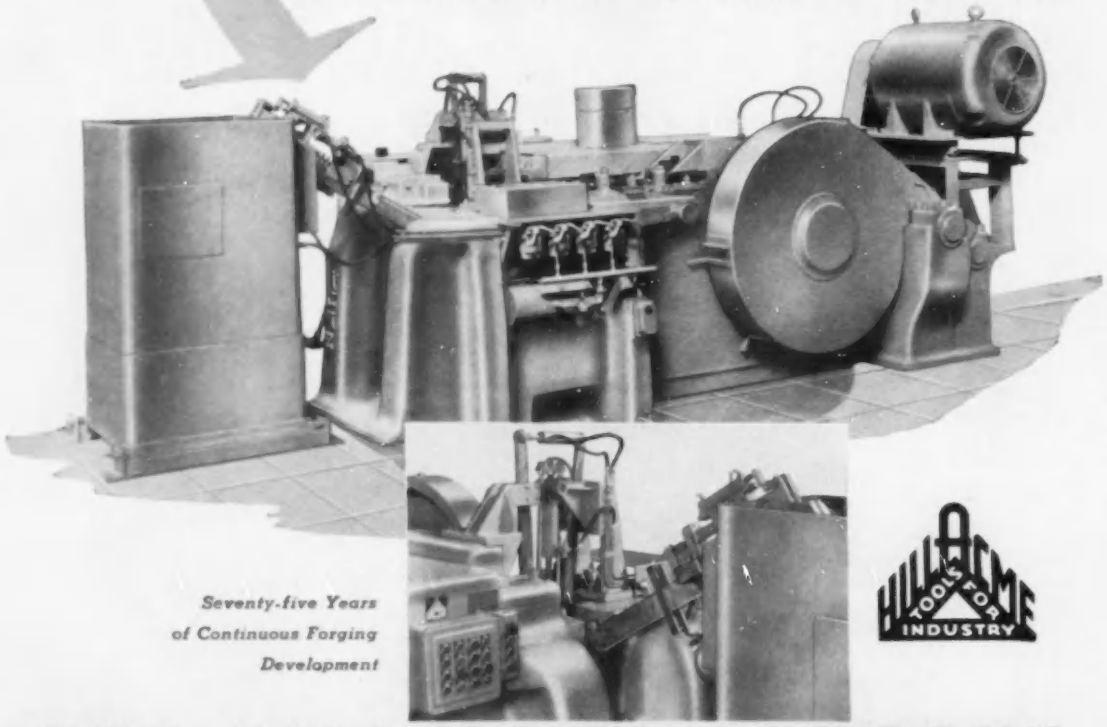
ACME MODEL XN

produces 2,400 completed forgings per hour!

A standard 3" ACME XN forging machine is producing, in multiple operations, a completed forging with every stroke of the machine in the plant of a large automotive manufacturer. Continuous operation with an automatic feeding device makes this amazing production possible.

PHENOMINAL SAVINGS

The increase in output through continuous operation of this ACME XN forging machine results in savings which are not only impressive but approach the incredible. The ACME XN with automatic feed is adaptable to either single or multiple operation forging. Every job, of necessity, calls for special design in the feed mechanism depending upon the shape, size and weight of the material involved. ACME XN forging machines are made in capacities from 1" to 5". We would like to discuss YOUR forging problems at your convenience.



Seventy-five Years of Continuous Forging Development

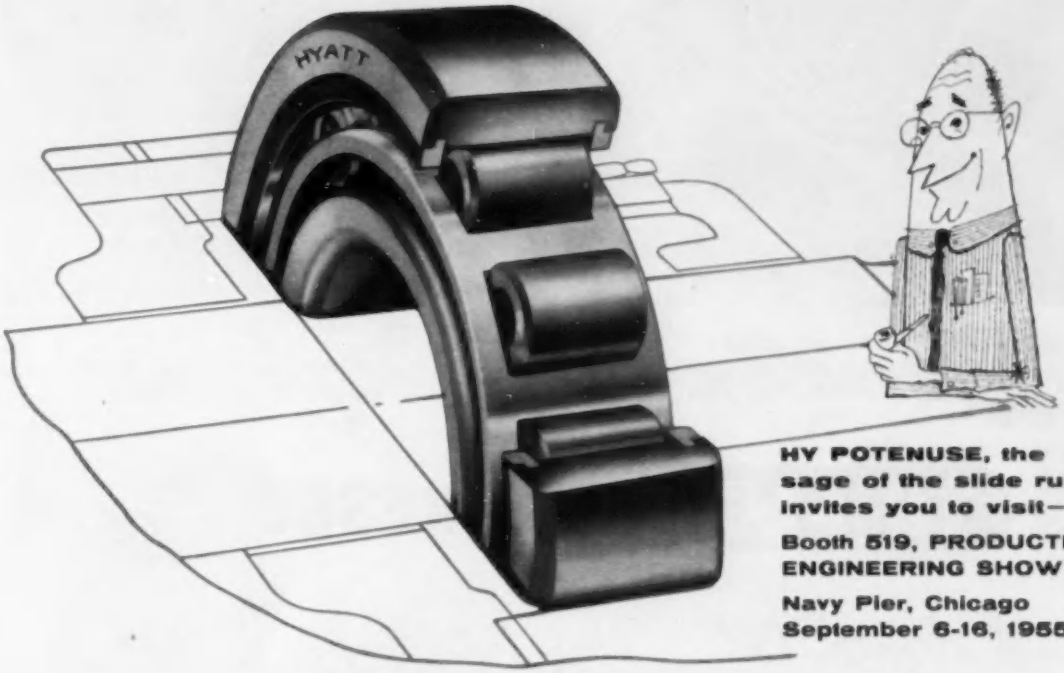
HILL ACME TOOLS FOR INDUSTRY

THE HILL ACME COMPANY

ACME MACHINERY DIVISION • **1209 W. 65th St., Cleveland 2, Ohio**
ESTABLISHED 1882

"ACME" FORGING • THREADING • TAPPING MACHINES • ALSO MANUFACTURERS OF "HILL" GRINDING AND POLISHING MACHINES • HYDRAULIC SURFACE GRINDERS • "CANTON" ALLIGATOR SHEARS • BILLET SHEARS • PORTABLE FLOOR CRANES • "CLEVELAND" KNIVES • SHEAR BLADES

How Hy-Loads can help you LICK LATERAL SHAFT EXPANSION!



HY POTENUSE, the sage of the slide rule, invites you to visit—

Booth 519, PRODUCTION ENGINEERING SHOW

Navy Pier, Chicago
September 6-16, 1955

YOUR COMPLETE LINE OF CYLINDRICAL ROLLER BEARINGS

HY SAYS:

Ever stumped by a spot where the shaft heats up and expands laterally—say in an electric motor? You know what happens with laterally locked bearings—you get cramping, misalignment, trouble with a capital T!

But a HYATT Cylindrical Roller Bearing solves all those problems so simply! It allows the shaft to float horizontally—"free lateral," we call it—and automatically compensates for expansion *without changing the bearing centers.* If you haven't a HYATT catalog handy, better send for yours right now. It'll show you exactly which bearing to use where, and help you find the *right* answers to a lot of pesky bearing problems. *Remember, you can't go awry when you specify—*

HYATT ROLLER BEARINGS

STRAIGHT ◯ BARREL ◯ TAPER ◯

HYATT BEARINGS DIVISION • GENERAL MOTORS CORPORATION • HARRISON, NEW JERSEY

Exhaustive Performance Tests In Actual Fleet Operation Prove . . .

Bendix-Westinghouse

TU-FLO 400 COMPRESSOR

The Finest Ever Built for the Trucking Industry!

That's a fact! Results of tests run by *actual* fleet operators over thousands of miles of *actual* day-after-day, 'round-the-clock truck operation prove this rugged new compressor superior in all performance departments! Here's what the participating operators reported about TU-FLO 400 performance . . . **"Produces more air at low and medium speeds where we need it most . . . has the best oil control of any compressor we've ever had . . . discharge temperatures are lower over the entire speed range . . . needs no periodic adjustment because it has no external moving parts . . . operates more efficiently at the higher speeds developed by our new engines . . ."**

But prove it for yourself—install a TU-FLO 400—available on an exchange plan through your Authorized Bendix-Westinghouse Distributor. We're sure you'll agree with all the others that here, indeed, *is the finest compressor ever built for the trucking industry.*

- **New-design inlet valves**
- **New unloading mechanism**
- **No external moving parts**
- **Available with attached governor if desired**
- **Available either self- or engine-lubricated**
- **Available air or water cooled**

Bendix-Westinghouse

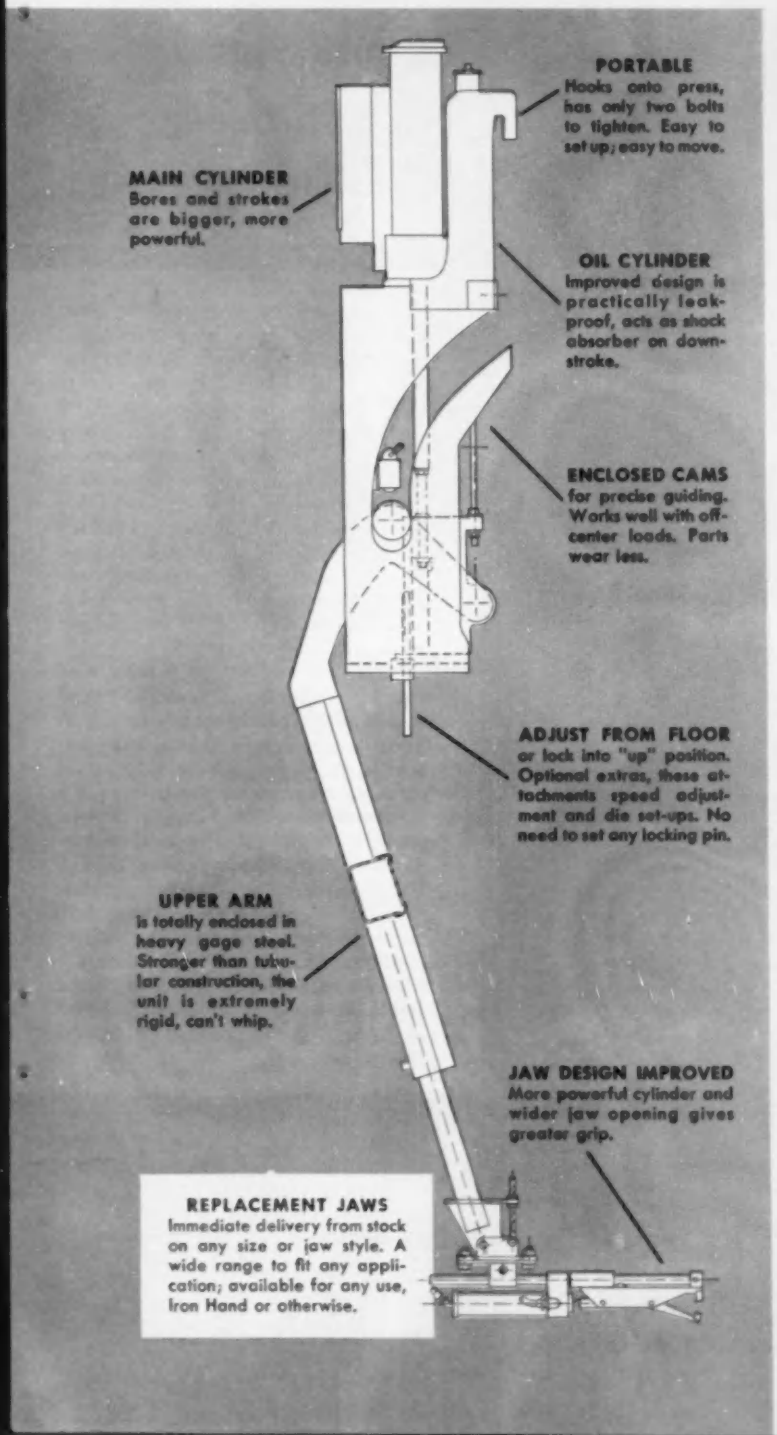
The World's Most Tried and Trusted Air Brakes

BENDIX-WESTINGHOUSE AUTOMOTIVE AIR BRAKE COMPANY

General Offices and Factory—Elyria, Ohio • Branches—Berkeley, Calif.; Oklahoma City, Okla.

BENDIX-WESTINGHOUSE AIR BRAKES REG. U.S. PAT. OFF.

New 1955 Model Iron Hand is more rugged than ever


PORTABLE
Hooks onto press, has only two bolts to tighten. Easy to set up; easy to move.
MAIN CYLINDER
Bores and strokes are bigger, more powerful.
OIL CYLINDER
Improved design is practically leak-proof, acts as shock absorber on down-stroke.
ENCLOSED CAMS
for precise guiding. Works well with off-center loads. Parts wear less.
ADJUST FROM FLOOR
or lock into "up" position. Optional extras, these attachments speed adjustment and die set-ups. No need to set any locking pin.
UPPER ARM
is totally enclosed in heavy gage steel. Stronger than tubular construction, the unit is extremely rigid, can't whip.
JAW DESIGN IMPROVED
More powerful cylinder and wider jaw opening gives greater grip.
REPLACEMENT JAWS
Immediate delivery from stock on any size or jaw style. A wide range to fit any application; available for any use, Iron Hand or otherwise.

Redesigned for heavy-duty work, it takes today's tough jobs with ease

The new 1955 Model Iron Hand has been designed from the ground up for bruising daily double-shift operation: jaws are wider-opening and much stronger, cams more precise, and the frame more rigid. The new design makes it easier to install, easier to adjust, and a cinch to move from press to press.

And performance reports from the field prove that maintenance time – always negligible–has been slashed to the bone by the new design.

Whether you now operate a battery of Iron Hands, or are first considering them, you ought to study the design improvements in the new 1955 Models. For complete information, write

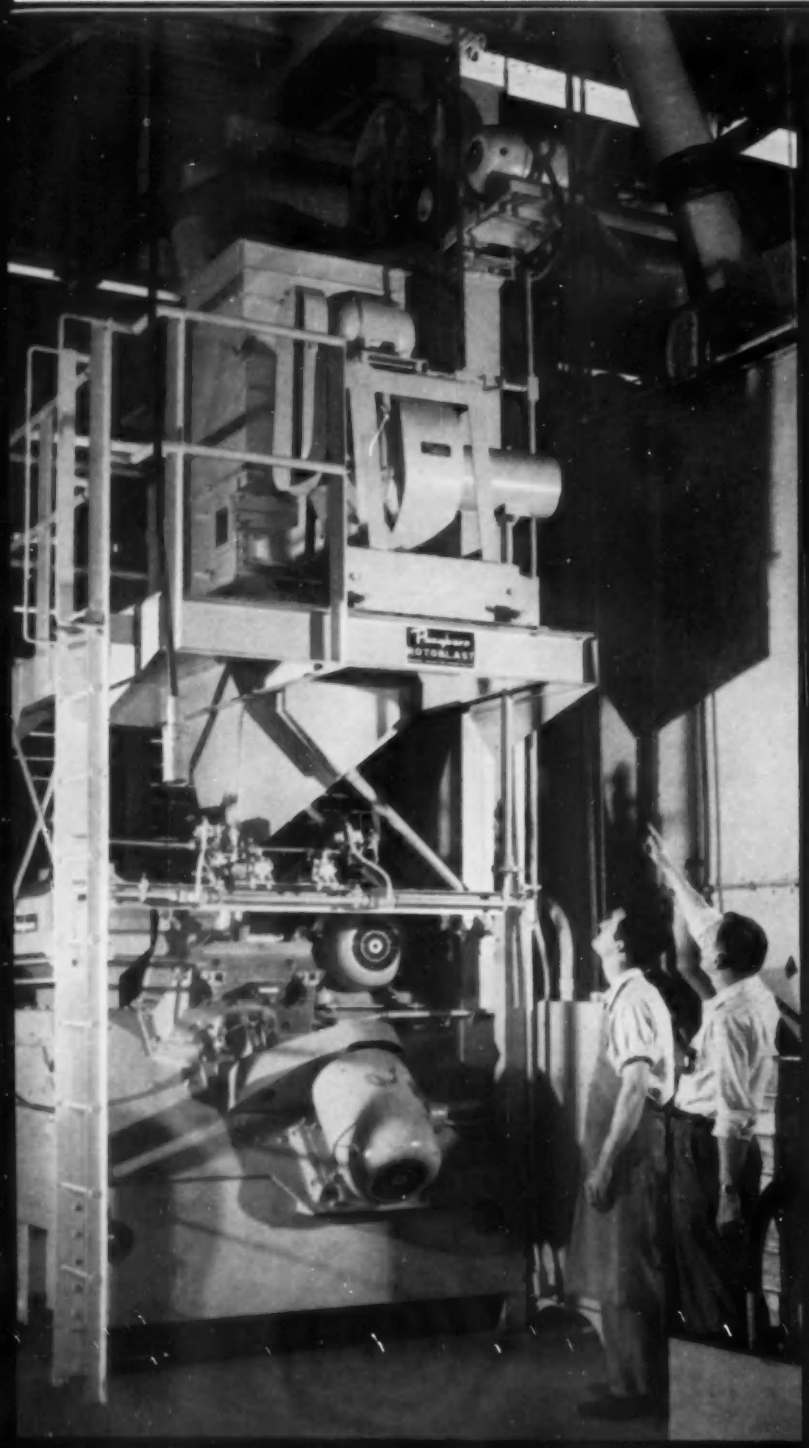
SAHLIN

ENGINEERING COMPANY, INC.

P. O. Box 289, Birmingham, Michigan

OVERHEAD ARMS • FLOOR TYPE UNLOADERS
TURNOVER, TRANSFER AND LOADING MACHINERY

IRON HAND



This special Pangborn Rotoblast® machine saves Hamilton Standard $20,000 a year!

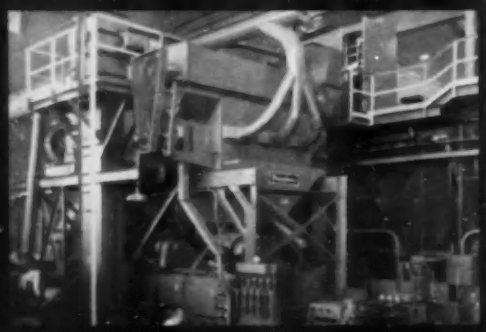
The special Pangborn Rotoblast Blast Cleaning Machine at left was designed by Pangborn for Hamilton Standard Division of United Aircraft Corp. This installation is used for blast cleaning and shot peening . . . saving Hamilton $20,000 a year. Below is another special Pangborn machine, owned by Parish Pressed Steel Division of Dana Corp., Reading, Pa. This Rotoblast Descaling Machine is used to clean steel sheets and coiled strip ranging in widths from 19″ to 60″ at a line speed of from 80′ to 150′ per minute.

These are just two of hundreds of special Pangborn machines used throughout the country—to clean parts that are fragile, odd-size or present some other obstacle to usual cleaning methods. If you have such a problem, Pangborn engineers will study it and its relation to your production line. The result will be a Pangborn machine designed especially to give *you* better cleaning and faster production at lower cost. Write today for Bulletin 227 to PANGBORN CORPORATION, 3900 Pangborn Blvd., Hagerstown, Md. *Manufacturers of Blast Cleaning and Dust Control Equipment.*

Pangborn

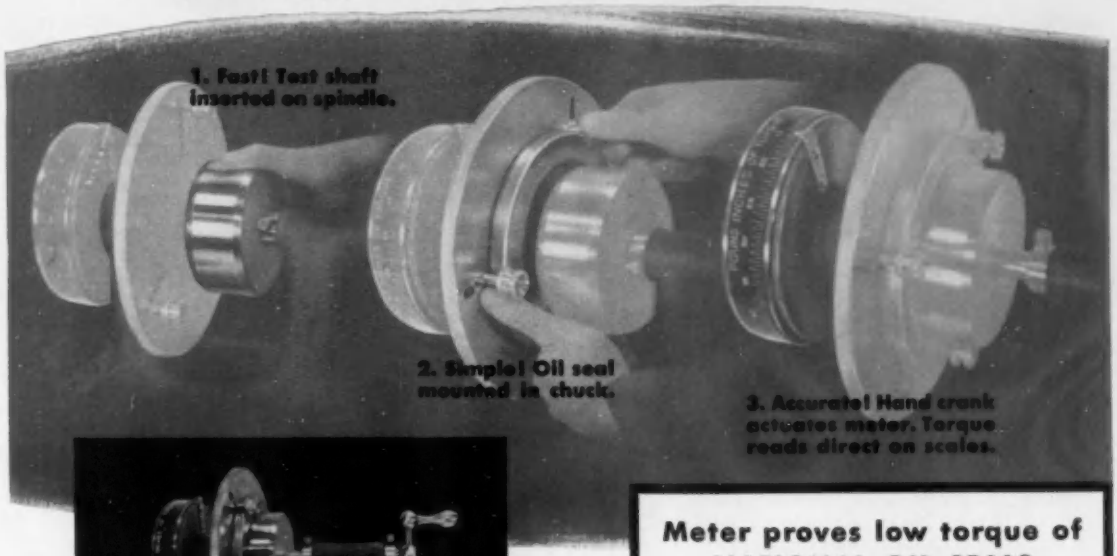
BLAST CLEANS CHEAPER

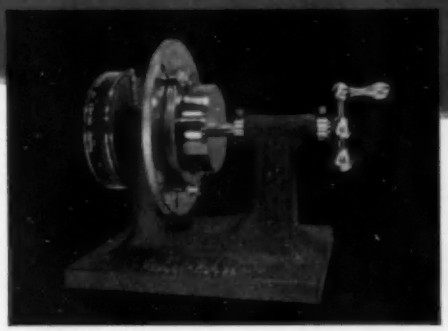
VISIT US AT BOOTH #117 AT THE METALWORKING MACHINERY AND EQUIPMENT EXPOSITION, CHICAGO, SEPTEMBER 6-17.



Now! MEASURE OIL SEAL TORQUE

quickly, accurately, by hand!


1. Fast! Test shaft inserted on spindle.
2. Simple! Oil seal mounted in chuck.
3. Accurate! Hand crank activates meter. Torque reads direct on scales.



New NMB Portable Torque Meter

For years, industry has needed a fast, accurate means of measuring oil seal torque for standards determination or during quality control and parts inspection.

The new NMB Portable Torque Meter offers laboratory accuracy for such measurements, yet is rugged, fool-proof, and easily used by production line or receiving department personnel. A minimum of operator training is required; readings are instantaneous and direct.

Two models are offered. Model 615 reads torque to 15 lb. in. on seals from ¾" to 6" diameter; Model 845 reads torque to 60 lb. in. on seals from 2¾" to 8" diameter. Both have a simple, self-centering chuck which accurately positions the seal, and employ standard tapered shafts (special to order). The meters are lightweight (about 27 lbs.) and quality built for years of dependable service. A carrying case is available.

Meter proves low torque of NATIONAL OIL SEALS

National Torque Meters give quick, convincing proof that National Oil Seals have lowest torque.

National Micro-Torc Leather Oil Seals have appreciably less torque than conventional leather seals. National Syntech® synthetic rubber seals also test materially less torque than ordinary synthetics.

Micro-Torc seals achieve their remarkably low torque from a high lubricity coating applied to the surface of the sealing member. (Inside of sealing member retains natural porosity and stores oil for semi-starved operation.)

Syntech Oil Seals have the famous National "minimum-contact" sealing lip which, combined with precision tensioning, insures the lowest torque consistent with effective sealing.

NATIONAL MOTOR BEARING CO., INC.

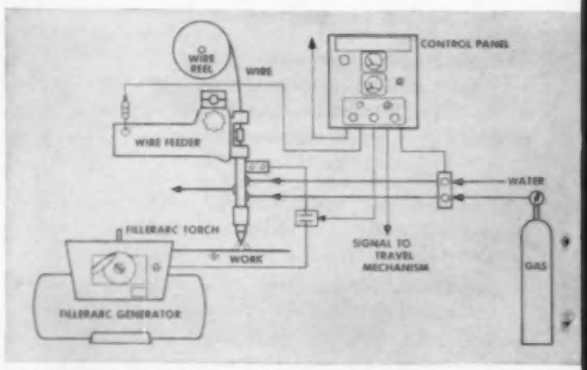
General Offices: Redwood City, California
Plants: Redwood City, Calif., Downey (Los Angeles County), Calif., Van Wert, Ohio

NATIONAL
OIL & GREASE SEALS
O-RINGS SHIMS

Call in a National Field Engineer

CHICAGO, ILL. . . . *Room 4113 Field Building, FRanklin 2-2847*
CLEVELAND, OHIO . *210 Heights Rockefeller Bldg., YEllowstone 2-2720*
DALLAS, TEXAS . . . *30½ Highland Park Village, JUstin 8-8453*
DETROIT, MICH. . . . . *726 Lothrop Avenue, TRinity 1-6363*
DOWNEY (Los Angeles Co.), CALIF. . *11634 Patten Rd., TOpaz 2-8166*
INDIANAPOLIS, INDIANA . *2802 North Delaware St., WAlnut 3-1535*
MILWAUKEE, WIS. . . *647 West Virginia Street, BRoadway 1-3234*
NEWARK, N. J. . . *Suite 814, 1180 Raymond Blvd., MItchell 2-7586*
REDWOOD CITY, CALIF. . . *Broadway and National, EMerson 6-3861*
WICHITA, KANSAS . . . . *519 South Broadway, WIchita 2-6971*

WELDING ARCS NEWS



G-E FILLERARC EQUIPMENT is the only complete equipment especially designed for consumable-electrode gas-shielded welding. Simplicity of the system makes possible use of less expensive fixtures and greater over-all efficiency.

NEW G-E Automatic Welding System Uses CO_2 to Slash Gas Costs 95%

FILLERARC . . . first *complete* equipment designed especially for automatic gas-shielded welding; combines unique generator with low-cost carbon dioxide—for sound welds on mild steel.

General Electric's new Fillerarc Automatic Welding Equipment brings you—not only 95% savings in shielding-gas costs—but ***sound welds on mild steel.*** The great savings possible through use of CO_2 as a shielding agent have long been recognized—but good mild steel weld quality has never been obtained. Now, after two years of successful application of Fillerarc equipment on non-ferrous metals (using inert gas), G-E engineers bring you the total solution for mild steel welding—***savings plus high quality.***

95% SAVINGS ARE POSSIBLE because CO_2 costs only *1/20th* as much as inert gas. For the average job, Argon would cost $5.00 per hour, CO_2 only twenty-five cents. This means yearly savings per equipment may be as high as $20,000 on a 3-shift, 60% duty cycle basis. This new G-E system can now replace the submerged arc method on many jobs and eliminate many of the problems associated with granular flux.

EXCLUSIVE G-E GENERATOR practically eliminates the erratic weld quality formerly obtained with CO_2. Here's why: Only the G-E Fillerarc generator—with its exclusive *rising* volt-ampere characteristic—supplies an arc length which always remains constant, even with adjustments in wire speeds. This means minimum weld porosity and spatter—and deep penetration for extra-strong welds.

COMPARED TO OTHER INERT-GAS SYSTEMS, G-E Fillerarc equipment . . .

- Reduces gas costs 95%, for yearly savings up to $20,000 per equipment;
- Delivers consistent weld quality because of the unique G-E Fillerarc generator;
- Assures constant speed; system is insensitive to normal line-voltage changes;
- Provides wire-feed speeds as high as 1000 I.P.M.

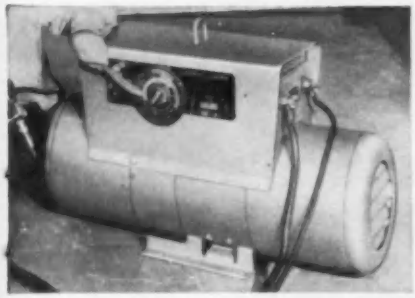
COMPARED TO FLUX-SHIELDED METHODS, G-E automatic Fillerarc equipment . . .

- Deepens penetration with low-cost CO_2;
- Provides a visible arc for full control of weld quality, permits less expensive fixtures;
- Does not use abrasive flux—especially important in welding compressor housings and similar jobs;
- Eliminates stubborn flux slag; cleaning costs are greatly reduced;
- Eliminates expensive flux recovery systems.

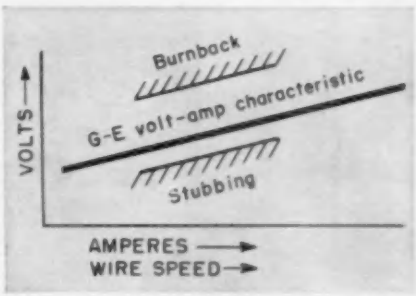
FOR MORE DATA contact your G-E welding sales engineer—and write for bulletin GEC-1334 to Section 713-1, General Electric Co., Schenectady, N. Y.

SEE G-E automatic Fillerarc equipment demonstrated at the National Metal Exposition, Philadelphia, October 17–21.

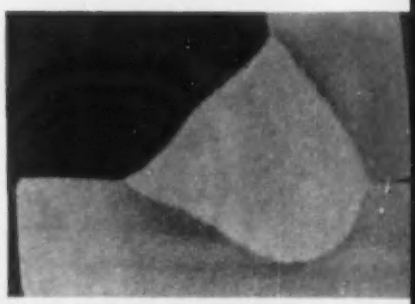
Why the complete G-E system makes possible quality mild-steel welds with CO_2



G-E SELF-REGULATING GENERATOR is the heart of the Fillerarc Automatic Welding system. Unique rising volt-amp curve maintains constant arc length.



RISING VOLT-AMP CURVE of the exclusive G-E Fillerarc generator matches rising arc curves . . . does not get into area of burnback and stubbing. Resulting high weld quality is uniform.



DEEP PENETRATION is produced by short arcs and faster wire speeds tpyical with Fillerarc equipment. Above: weld on semi-killed steel.

Progress Is Our Most Important Product

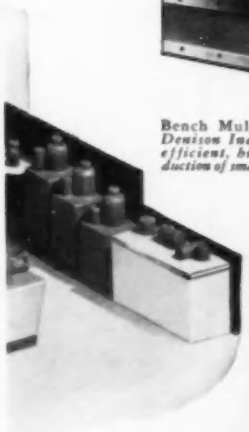
GENERAL ELECTRIC

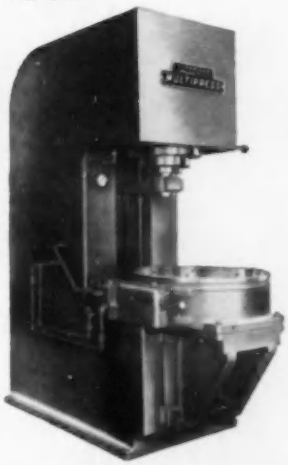
TO FIND
to all
VISIT US AT
BOOTH 819
THE
MACHINE TOOL
SHOW
CHICAGO, ILL.
SEPT. 6-17, 1955
INTERNATIONAL AMPHITHEATRE
M T
DENISON
DENISON

THE ANSWERS
your pressing needs

YOUR KEY TO AUTOMATION ON ASSEMBLING • RIVETING
DRAWING • PUNCHING • MARKING • TRIMMING • PELLETING
COMPACTING • TESTING • STRAIGHTENING • BROACHING • SWAGING

Bench Multipress *with Denison Index Table for efficient, high-speed production of small, light parts.*





75-ton Multipress *with Denison Index Table for automatic production of heavy parts.*

SEE HOW DENISON'S *faster cycle time*
- speeds production
- simplifies operations
- makes products better . . . yet cuts costs

SEE DENISON LINE OF MULTIPRESS
demonstrated with
Index Tables Stock Feeds Hydraulic Servo Controls
for automatic and semi-automatic operation

SOMETHING EXTRA FOR AUTOMATION ENGINEERS
Newest developments in hydraulic pumps, motors and controls are being demonstrated and displayed to benefit machine designers, equipment builders and production engineers. A Denison hydraulic engineer will explain how you can simplify your circuits, build greater dependability into your hydraulics . . . and at the same time cut costs.

BRING YOUR PRESS PROBLEMS ALONG.
LET US HELP YOU SOLVE THEM
with DENISON HYDRAULIC MULTIPRESS

THE
DENISON ENGINEERING COMPANY
1212 Dublin Road Columbus 16, Ohio
Subsidiary of American Brake Shoe Co.

DENISON Hydr**OIL**ics

THE PRECISION

LINE

AT THE SHOW...
BOOTH 1416

Don't miss seeing the latest developments in The Precision Line of Fellows Gear Production Equipment. If you don't make it to the Show... then it will pay you to contact your nearby Fellows Office for the latest facts.

● THE FELLOWS GEAR SHAPER COMPANY,
Head Office and Export Department:
78 River Street, Springfield, Vermont.
Branch Offices: 819 Fisher Building, Detroit 2;
5835 West North Avenue, Chicago 39;
2206 Empire State Building, New York 1;
6214 West Manchester Avenue, Los Angeles 45.

Fellows *Gear Production Equipment*

HOW R/M ENGINEERING SETS

R/M
FIRST IN FRICTION

These are just a few of the friction parts—brake linings, clutch facings and automatic transmission bands—that R/M makes of woven asbestos.

THE RECORD OF "FIRSTS" IN FRICTION MATERIAL DEVELOPMENT SHOWS WHY R/M IS FIRST IN FRICTION

FIRST Woven Brake Lining • FIRST Asbestos Brake Lining • FIRST Ground Wearing Surface • FIRST Zinc Alloy Wire Brake Lining • FIRST Pre-Treated Yarns • FIRST Extruded Pulp Brake Lining • FIRST Flexible Pulp Brake Lining in Rolls • FIRST Dry Process Brake Lining • FIRST Semi-Metallic Brake Lining • FIRST Bonded-to-Metal Brake Lining • FIRST Woven Clutch Facings • FIRST Molded Asbestos Clutch Facings for Clutches Operating in Oil FIRST Endless Woven Clutch Facings • FIRST Pre-Treated Clutch Facings • FIRST Bonded-to-Metal Clutch Facings

THE PACE IN FRICTION MATERIAL DEVELOPMENT

WOVEN BRAKE LININGS AND CLUTCH FACINGS

In either wet or dry operation, R/M Woven Asbestos Friction Materials offer specialized performance characteristics that could help solve problems you may be facing now.

No other material, for example, gives the same "feel" in automatic transmissions—or in passenger car brakes. No other material is as good for band brakes in oil well equipment. And R/M Woven Asbestos is now being used in applications as divergent as baby carriage brakes and fishing reel drags.

Raybestos-Manhattan, for over 50 years the world's largest maker of friction materials, has pioneered in the development of woven asbestos. R/M made the first woven brake lining—the first woven clutch facings. And continuous research and testing has given R/M a fund of knowledge concerning woven asbestos friction materials second to none in the industry.

By changing the mix ratio of asbestos and cotton, by using different yarn sizes and twists, and by variation of pretreatment and final treatment, R/M can produce in woven asbestos a range of friction characteristics that may well meet your requirements better than any other material.

In many applications, however, you will get best results by combining woven asbestos with other friction materials. Such combinations tend to keep the friction level more normal, since the different materials do not reach their critical points at the same time. And due to making all kinds of friction materials, R/M is in an ideal position to develop just the right combination for your needs.

R/M Works with All Kinds of Friction Materials

R/M offers the widest range of friction materials in the industry . . . from woven and molded asbestos to cork-cellulose, sintered metals, and ceramics. This is of major importance to the O.E.M. For it means that by consulting R/M, he can get the benefits of wider experience, and he can be sure of absolutely unbiased advice on which materials or combinations of materials are best suited to his individual application.

If you feel that friction material performance could be improved in any equipment you manufacture, contact Raybestos-Manhattan now. All the depth and breadth of R/M experience is as near as your telephone.

Write for your free copy of R/M Bulletin No. 500. Its 44 pages are loaded with practical design and engineering data on all R/M friction materials.

R/M
FIRST IN FRICTION

THE TRADE-MARK THAT SPELLS PROGRESS IN FRICTION MATERIAL DEVELOPMENT

RAYBESTOS-MANHATTAN, INC.

EQUIPMENT SALES DIVISION: 6010 Northwest Highway, Chicago 31, Ill. · Detroit 2 · Cleveland 14 · Los Angeles 58
FACTORIES: Bridgeport, Conn. Manheim, Pa. Passaic, N.J. No. Charleston, S.C. Crawfordsville, Ind. Neenah, Wis.
Canadian Raybestos Co. Ltd., Peterborough, Ontario, Canada

RAYBESTOS-MANHATTAN, INC., Brake Linings • Brake Blocks • Clutch Facings • Fan Belts • Radiator Hose • Industrial Rubber, Engineered Plastic, & Sintered Metal Products • Rubber Covered Equipment • Asbestos Textiles • Packings • Abrasive & Diamond Wheels • Bowling Balls

Bendix Products Division

A good reliable source

FOR AUTOMOTIVE EQUIPMENT

From four wheel brakes to the latest development in power braking, Bendix Products Division has demonstrated its unique ability not only to keep pace but *actually to anticipate* the industry's requirements for the latest and most efficient in automotive components.

TYPICAL EXAMPLES

BENDIX LINKAGE TYPE POWER STEERING—Because Bendix* Power Steering is of the linkage type, manufacturers find it especially adaptable for production line installation without extensive engineering changes. Manufacturers can now meet the ever-increasing demand for power steering more efficiently and more economically with Bendix Linkage Type Power Steering.

BENDIX LOW PEDAL POWER BRAKE—Specified by more car manufacturers than any other make, Bendix* Low Pedal Power Brake makes possible quick, sure stops by merely pivoting the foot from the go to the stop control. No need to lift the foot and exert leg power to bring the car to a stop. Result—more driving comfort, less fatigue and greater safety.

*REG. U. S. PAT. OFF.

BRAKES • POWER STEERING • POWER BRAKING • CONSTANT VELOCITY UNIVERSAL JOINTS • HYDRAULIC REMOTE CONTROLS

BENDIX PRODUCTS DIVISION SOUTH BEND INDIANA
DIVISION OF Bendix AVIATION CORPORATION

Export Sales: Bendix International Division, 205 East 42nd Street, New York 17, N. Y.

AUTOMOTIVE INDUSTRIES

BUSINESS DEPARTMENT

Jack C. Hildreth, Publisher
John F. Pfeffer, Asst. to Publisher
E. H. Miller, Advertising Mgr.
E. W. Hevner, Circulation Mgr.
John R. Flood, Market Research
Chestnut and 56th Sts.
Philadelphia 39, Pa.
Phone GRanite 4-5600

REGIONAL MANAGERS

CHICAGO—John T. Hoole
916 London Guarantee and Accident Building
Chicago 1, Ill.
Phone FRanklin 2-4243

DETROIT—Melvin B. Nylund
1015 Stephenson Bldg.
Detroit 2, Mich.
Phone TRinity 5-2090

PHILADELPHIA and NEW YORK—
Nelson W. Sieber
Chestnut and 56th Sts.
Philadelphia 39, Pa.
Phone GRanite 4-5600
and
100 East 42nd St.
New York 17, N. Y.
Phone OXford 7-3400

CLEVELAND—Richard P. Keine
730 National City Bank Bldg.
Cleveland 14, Ohio
Phone CHerry 1-4188

SAN FRANCISCO—
R. J. Birch and Frank W. McKenzie
300 Montgomery St.
San Francisco 4, Calif.
Phone DOuglas 2-4393

LOS ANGELES—L. H. Jackson
3156 Wilshire Blvd.
Los Angeles 5, Calif.
Phone DUnkirk 7-2119

One of the Publications Owned by
CHILTON CO. (INC.)
Executive Offices
Chestnut & 56th Sts.
Philadelphia 39, Pa., U.S.A.

Officers and Directors

JOSEPH S. HILDRETH, *Chairman of the Board*
G. C. BUZBY, *President*
Vice Presidents
P. M. FAHRENDORF
HARRY V. DUFFY
Treasurer—WILLIAM H. VALLAR
Secretary—JOHN BLAIR MOFFETT
GEORGE T. HOOK
MAURICE E. COX
TOM C. CAMPBELL
FRANK P. TIGHE
L. V. ROWLANDS
ROBERT E. McKENNA
IRVING E. HAND
EVERIT B. TERHUNE, JR.
J. C. HILDRETH, JR.
RUSSELL W. CASE, JR.

High Spots of This Issue

★ Making Industrial America Stronger

The vital role that the metalworking industries have played in forming and hardening the sinews of U. S. industrial might is stressed this month in three shows at Chicago. This section contains editorial material in keeping with this theme. Page 77.

★ Machine Tool Show

First such exposition of its type to be held in eight years, the Machine Tool Show in Chicago's International Amphitheatre and Exposition Hall is truly mammoth in scope. Reviewed here are many of the new developments to be shown. Page 111.

★ Production Engineering Show

About 180 exhibitors will be on hand at Chicago's Navy Pier to show their latest products that fall into eight general categories. Emphasis will be placed on cost reduction and automaticity, and seminars will also be held on these topics. Page 209.

★ Coliseum Machinery Show

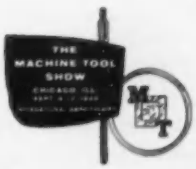
The 90 manufacturers participating in this particular exposition for non-members of the National Machine Tool Builders Association will have much of interest to show. Included are general purpose and specialty machine tools and hand tools. Page 227.

★ Lincoln for 1956 Has 285-Hp Engine

Characterized by new styling and performance, the new Lincoln passenger car line is offered in two series and five body styles. Salient features of the new power plant, safety improvements, and other points are covered in this report. See Page 234.

★ 150 New Product Items And Other High Spots, Such As:

Machine tool development coordination; growth of American metalworking equipment; machine tool productivity; automation news report; and metals market report.



Complete Table of Contents, Page 3
Automotive and Aviation News, Page 65

AUTOMOTIVE INDUSTRIES COVERS
PASSENGER CARS • TRUCKS • BUSES • AIRCRAFT • TRACTORS • ENGINES • BODIES • TRAILERS • ROAD MACHINERY • FARM MACHINERY • PARTS AND COMPONENTS • ACCESSORIES • PRODUCTION EQUIPMENT • SERVICE EQUIPMENT • MAINTENANCE EQUIPMENT
ENGINEERING • PRODUCTION • MANAGEMENT

Blueprint for Progress ...in Metalworking

When you visit the Machine Tool Show, keep **1205** in mind. It's a good number to remember, for in this area you will see the newest machine tool products of The Cincinnati Milling Machine Co. Most of them are new from the floor up, and never before have been exhibited. All of them will be in action—many operating on actual production setups that might well have been taken from your shop. Others will be set up so that you might personally get the "feel" of the new features, and more fully realize their advantages. Cincinnati Milling's display may truly be the blueprint to your future progress in metalworking. Be sure to visit Area **1205**; you'll see new methods and equipment, and you will go away with many practical ideas which can be put to work in your shop.

THE CINCINNATI MILLING MACHINE CO.
CINCINNATI 9, OHIO

Area 1205
EXPOSITION HALL

- **A** Knee-Type Milling Machines
- **B** Bed Type Milling Machines
- **C** Die Sinking Machines
- **D** Cutter and Tool Grinders, and Surface Grinder
- **E** Centertype Grinding Machines
- **F** Centerless Grinding Machines
- **G** Hydro-Tel Milling Machine
- **H** Hydro-Broach Machine
- **J** Hydroform Machine

CINCINNATI

CINCINNATI

MACHINE TOOLS FOR MILLING • BROACHING • GRINDING • CUTTER GRINDING • METAL FORMING

News of the AUTOMOTIVE AND AVIATION INDUSTRIES

Vol. 113, No. 5 September 1, 1955

1956 Rambler Output To Start This Month

First pilot models of the 1956 Rambler cars will start coming off the assembly lines in Kenosha, Wis., about the third week in September. It will be the first time that Ramblers will be built on separate final assembly lines. These were installed under the corporation's $60 million expansion program which will increase Rambler output 60 per cent. Formerly, all American Motors cars were assembled on the same lines.

In addition to the separate assembly lines, the plant will have new subassembly and feeder lines, and inspection and testing facilities for the Rambler. Other expenditures have been earmarked for expanding the Kenosha engine plants and the Milwaukee body plant.

Mercury Expanding Plant In Wayne By 20 Per Cent

Mercury will increase the size of its Wayne, Mich., plant 20 per cent by adding a 300,000 sq ft annex to the existing unit. It will mark the first major expansion of that unit since it was built in October, 1952.

The division did not specify what would be produced at the new plant, but it indicated that the unit is part of an overall program to increase production facilities. Scheduled for operation within a year, the plant will give Mercury a total of 1.8 million sq ft of space in Wayne.

Ford Steps Up Research On Paint and Chemicals

Ford is starting to go into paint research work much heavier than it has in the past. William T. Thies, former research manager of Cooke Paint and Varnish Co., will direct an expanded program of development, formulation, and applied research of paint, vinyl, and other chemicals at Ford's Highland Park, Mich., plant.

About six months ago three operations at the plant were consolidated as the Associated Operations of Ford Div. under Earl G. Ward. The new operational setup includes the Industrial Engine Department, the trim plant, and the paint and chemical products plant.

INTERNATIONAL LIGHTWEIGHT FOR ALL TERRAIN

Recently introduced by the Motor Truck Div. of International Harvester Co. is the new four-wheel drive light-duty Model R-120 truck at 7000 lb GVW. Offered in four wheelbases between 115 and 134 in., it is powered by a 108-hp International unit.

Chrysler of Canada Finishing Work On New V-8 Engine Plant

As in the U. S., Chrysler's operations in Canada are undergoing continuous expansion. Among the latest is a new V-8 engine plant in Windsor, Ont., now nearing completion.

Chrysler of Canada's comeback has been just as amazing as that of its parent company in the U. S. The Canadian company's market penetration has soared to 24 per cent from 15 per cent last year, and the company now is shooting for one-third of the market in that country. When the new facilities are completed, Chrysler of Canada expects to be turning out 600 cars a day, compared with 480 at present.

Volkswagen to Build Cars At Former Studebaker Unit

Volkswagen Automobile Works of Germany has bought the former 400,000 sq ft Studebaker plant in New Brunswick, N. J., thus becoming the first foreign maker to assemble its cars in the U. S. The company currently is exporting 2500 of the little cars to the U. S. monthly and hopes to sell in the neighborhood of 35,000 this year.

Volkswagen expects to be turning out the cars in the N. J. plant next year. The facility is located on a 165-acre site 35 miles from New York City.

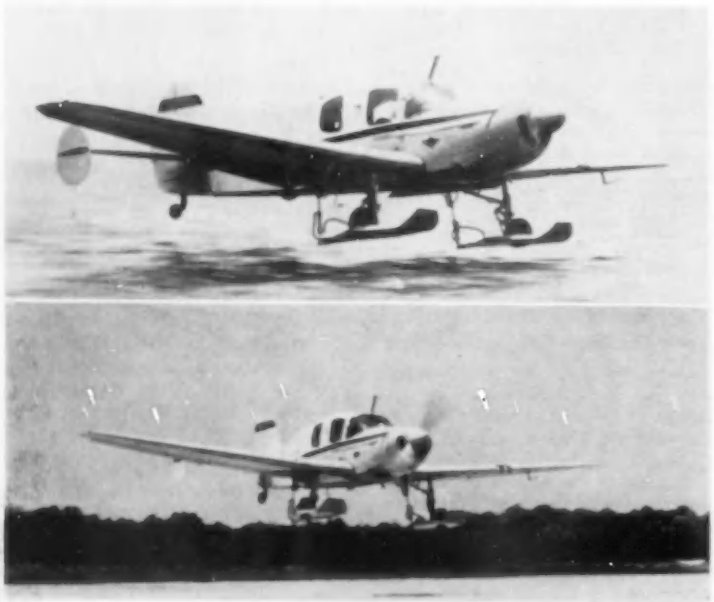
Goodyear Set Record For Sales, Earnings

Record sales of $679.67 million have been reported by Goodyear Tire & Rubber Co. for the first six months of this year, an increase of more than $128 million above the like 1954 period. Earnings also rose to an all-time high of $27.26 million, compared with $24.62 million for the corresponding period of 1954.

News of the AUTOMOTIVE

ELECTRIC SPORTS CONVERTIBLE WITH PLASTIC BODY

First in a series of "turbo-electric" automobiles scheduled for production by Electronic Motor Car Corp. is the La Saetta sports model convertible with body of glass fiber reinforced plastic construction. The car will be powered by an electric motor within the rear axle housing running on a series of silver-zinc-peroxide batteries totaling 200 volts. The company states that a gasoline-powered turbo-generator unit will operate automatically to recharge batteries when stored electricity drops below a certain level. Sedan, station wagon, and panel truck models are being readied for the future.



AERIAL HYDRO-LIFT GEAR PERMITS ALL OPERATIONS

In the top illustration a Bellanca Cruisemaster, equipped by All American Engineering Co. with a new retractable hydro-lift gear, is shown landing on the water as a seaplane. The lower photo shows how wheels protruding from the hydro-lift gear permit the aircraft to land on hard surface runways or fields. The hydro-lift plane can also operate from mud, snow, or ice, the company states.

Oldsmobile Notes Increase In Sale of Air Conditioning

While sales of air conditioners for automobiles represent only a small fraction of total automobile production, almost every car factory offering the units has noted a material rise in sales this year. Oldsmobile, for example, has installed more than 14,000 of the systems at the factory, while an additional 2100 were requested by dealers for installation at point of sale during the first six months. This figure represents about 4.5 per cent of total Oldsmobile car output, compared with only 2.6 per cent in the comparable 1954 period.

GMC Receives $5.6 Million Order for Trucks For U. S.

GMC Truck & Coach Div. has received another order for trucks from the Government. The latest calls for $5.6 million worth of 2½-ton stake body trucks for the Detroit Ordnance Tank-Automotive Command, said to be the largest single order ever placed by the U. S. for such a truck model. The order is for 4x2 standard commercial vehicles, rather than for tactical military units

Chevrolet Tests Confirm Horsepower-Safety Link

Chevrolet has come up with some interesting figures on the relationship between safety and horsepower. The figures were garnered from "passing tests" conducted with 1951, 1954, and 1955 cars at 20 and 60 mph, with horsepowers of 105, 125, and 162 respectively.

According to the tests, cars with higher horsepower showed quicker passing ability than those with lower horsepower. Thus, the result of previous similar tests made by the automobile industry were confirmed. For example, the 1951 car operating in a prescribed driving range required 250 ft to pass a "pace car" which maintained a 20 mph speed; the 1954 car required 225 ft; and the 1955 model passed the car in 190 ft. When the pace car went 60 mph, it took the 1951 model 1200 ft to complete the pass; the 1954 model, 1030 ft; and the 1955 model, only 970 ft.

AND AVIATION INDUSTRIES

Agricultural Implement Makers Approve GAW Pacts With Union

The modified annual wage principle, established by Ford and General Motors, continues to spread to other industries. Caterpillar Tractor Co. and John Deere Co. became the first two agricultural implement concerns to sign contracts embodying the supplemental layoff pay plan.

At press time, negotiations were continuing at Allis-Chalmers and International Harvester. In addition to the GAW principle, Caterpillar and International granted wage increases and a number of other benefits, such as improvements in pension programs and insurance.

Pontiac Marks Production Of 500,000th 1955 Vehicle

Although the production pace in the automobile industry has begun to slacken somewhat, high output in previous months has given several car makers new records. Pontiac, on Aug. 11, produced its 500,000th car of the 1955 model run.

The GM division estimated that it will build more than 550,000 units during the 1955 model run, a new record. Pontiac's previous production record of 446,429 cars was set during the 1950 model run.

Square D Co. Set to Build Plant in Royal Oak, Mich.

Square D Co. has decided to go ahead with plans to build a new plant in Royal Oak, Mich., following agreement with the union on several issues. Earlier this year, the company called off plans for the plant when the union demanded that similar working rights be granted there as at the Detroit plant. The new agreement calls for separate contracts at the two Detroit area plants.

To be located on a 19-acre site, the 600,000 sq ft Royal Oak unit will manufacture heavy electrical equipment. It is part of an expansion program under which the company has more than doubled facilities since the end of World War II.

Production at two other new plants —in Cedar Rapids, Ia., and Secaucus, N. J.—already has begun, and when the Royal Oak unit is completed, the company will have added more than 250,000 sq ft of manufacturing space this year.

CHEVROLET REGAINS LEAD FROM FORD IN SIX MONTHS

1955 New Passenger Car Registrations*

Arranged by Makes in Descending Order According to the 1955 Six Months' Totals

MAKE	June 1955	May 1955	June 1954	SIX MONTHS Units 1955	SIX MONTHS Units 1954	SIX MONTHS Per Cent of Total 1955	SIX MONTHS Per Cent of Total 1954
Chevrolet	164,000	149,948	152,028	756,317	697,852	21.48	24.78
Ford	140,699	137,192	168,804	741,481	706,577	21.07	25.08
Buick	69,974	71,250	52,753	381,693	258,589	10.84	9.22
Plymouth	63,567	62,653	42,776	343,711	216,428	9.77	7.68
Oldsmobile	54,383	50,637	44,234	290,555	195,125	8.26	6.93
Pontiac	50,075	48,748	30,883	265,714	181,188	7.55	6.44
Mercury	36,202	30,350	27,972	178,390	152,456	5.07	5.41
Dodge	25,068	25,498	14,114	146,026	78,380	4.15	2.78
Chrysler	15,027	14,874	8,726	85,241	56,493	2.42	1.97
Cadillac	11,740	12,922	11,650	74,029	53,727	2.10	1.91
De Soto	11,639	11,195	6,701	63,217	40,638	1.80	1.44
Studebaker	9,633	9,596	6,170	53,325	47,968	1.52	1.70
Nash	10,666	10,085	8,792	47,281	43,615	1.34	1.55
Packard	5,356	5,533	3,105	26,796	22,677	.76	.81
Hudson	4,883	4,786	3,713	23,643	17,086	.67	.61
Lincoln	3,225	3,042	3,612	18,509	19,805	.44	.70
Willys	575	706	1,914	4,358	9,700	.12	.34
Kaiser	83	64	891	780	4,794	.02	.17
Misc. Domestic	28	28	339	206	2,022	.01	.07
Foreign	4,568	4,195	2,374	21,366	11,480	.61	.41
Total—All Makes	681,372	661,304	596,753	3,519,629	2,816,800	100.00	100.00

* Based on data from R. L. Polk & Co.

FOUR-ENGINE HERCULES FLEXES MIGHTY SINEWS

Shown coming off the production line at the Marietta, Ga., plant of Lockheed Aircraft Corp. is the new Lockheed C-130 Hercules transport plane. The giant aircraft is powered by four Allison T56 turboprop engines. Officially qualified at 3750 eshp, the T56 develops 2.3 hp for each pound of engine weight.

News of the AUTOMOTIVE

Renault Buys Facilities Of Salmson Automobile Co.

Since Renault recently purchased its land, buildings, and plant, Salmson Automobile Co. has now ceased to exist as an automobile producer.

Among the oldest French automobile concerns, the Salmson factory at Billancourt, near Paris, covers an area of 603,000 sq ft. It produced both automobiles and piston-type, medium-powered aviation engines. For several years it has been in financial difficulties, and a recent attempt to refloat it with Belgian capital and the production of a sports model failed.

Adjoining its own works, this acquisition will enable Renault to increase production of passenger cars and light trucks. Of the 600 workers employed by Salmson, it is understood that Renault will absorb 150 before the end of the year.

Bendix Enlarging Facilities For Research in Detroit Area

Bendix Aviation Corp. has announced plans for construction of a new multi-million dollar plant north of Detroit for its Research Laboratories. To be located on a 46-acre site, the unit will provide 85,000 sq ft of floor space.

CHRYSLER UNVEILS TRIO OF EXPERIMENTAL CARS

These three experimental cars were conceived by the Engineering Div. of Chrysler Corp. to translate into steel and glass advanced styling ideas and to provide criteria by which to measure public acceptance of new concepts. The trio consists of: Flight Sweep I four-passenger sports convertible (top); companion Flight Sweep II sports hardtop (center); and Falcon two-passenger sports roadster. The first two have an overall length of 207 in., width of 70⅜ in., height of 53½ in., and wheelbase of 120 in. Dimensions of the Falcon are: overall length, 192 in.; width, 68¼ in.; height, 51⅛ in.; and wheelbase, 105 in. All three are powered by a special Chrysler V-8 engine.

$50 Million Plymouth V-8 Unit Includes Numerous Innovations

Plymouth has coined the term "qualimatic" for its new $50 million V-8 engine plant in Detroit (see AI, March 15, p. 77). It describes the term as denoting quality production through automatic processes.

The new plant is currently turning out 600 engines a day. This rate will be gradually increased to 3000.

Machines and their bases have been standardized for easy interchangeability of units of the same type. Another important development is the use of horizontal spindle machines for what is said to be greater accessibility in tool changes and increased rigidity.

Cylinder blocks will be machined on two parallel production lines more than a quarter of a mile long. Each line will have 70 machines performing a total of 157 operations. A huge broach, measuring 12 ft high, 19 ft wide, and 59 ft long, heads each block line. Both ends of the block are machined in a single pass, while a second broach completes the top and bottom.

Materials are moved on more than four miles of overhead conveyors. Small engine parts are moved from storage to the assembly line in color-coded plastic trays. More than 4000 ft of conveyors are used to convey crankshafts from one operation to the next.

Another interesting innovation is the use of automatic test stands. Engines are moved by conveyors, where oil, water, and natural gas connections are made automatically, for a 20-minute run-in test. Seventy-two engines can be tested at once on the units, which were reportedly designed specially for the operation.

Canadian Vehicles Registered Showed Tangible Rise in 1954

A preliminary report on total 1954 Canadian registrations shows 3,644,589 motor vehicles of all types, compared to 3,430,672 in 1953. Passenger cars totaled 2,682,430; trucks, 855,723; buses 5,078; and motorcycles, tractors, and other motor vehicles made up the remaining 101,353 units.

AND AVIATION INDUSTRIES

LOW-SPEED WIND TUNNEL

Front view of giant 20-ft laminated spruce propeller, which provides 200-mph wind to operate Chance Vought Aircraft's new low-speed wind tunnel, is shown here. The 1500-hp electric motor which drives the propeller is completely housed in a plywood fairing 32 ft from blunt nose to painted trailing tip.

Lancia and Fiat Join Hands To Help Ferrari in Racing

Bent on enhancing Italian prestige, Lancia and Fiat have agreed to support the Ferrari racing program. Lancia will turn over its latest racing cars to Ferrari for examination and for use if necessary, thus apparently confirming the former's intention to withdraw from speed contests.

Fiat, the biggest manufacturer in Italy, has no racing program. It will subsidize Ferrari to the extent of $78,000 a year, in addition to giving technical assistance.

The move is reportedly directed against Mercedes-Benz, the only big European manufacturer maintaining a complete racing organization. With the backing of Fiat and Lancia, it is expected that Ferrari will be in a position to complete its latest racing models and compete successfully

Six complete racing cars, one of which has never been used, six spare engines, two special prototype bodies and 90 boxes of parts, and racing equipment have been turned over to Ferrari by Lancia. In addition, Lancia has supplied a quantity of drawings and projects for future cars.

AI TABLOID

Royal Aircraft Corp., subsidiary of Kearney & Trecker Corp., has begun production and marketing of the amphibian Royal Gull airplane.

* * *

General Electric Co. has formed a new Special Defense Projects Dept. within its Atomic Energy and Defense Products Group.

* * *

Triumph TR2 sports car will be available in the future with Laycock-de-Normanville overdrive on second, third, and top gears.

* * *

Kaiser Aircraft & Electronics Corp., subsidiary of Willys Motors, Inc., will acquire the aircraft and electronics businesses now being conducted by the parent automotive concern.

* * *

Yale & Towne Mfg. Co. has opened a new sales and service branch in Detroit at 4466 Woodward Ave. . . . Houdaille-Hershey Corp. has opened new executive offices in Buffalo, N. Y. . . . Goodyear Aircraft Corp. has established an office in Washington, D. C.

* * *

Chrysler Corp. of Canada turned out recently the first Chrysler V-8 engine at its new Windsor, Ont., engine plant.

* * *

Douglas Aircraft Co., Inc., has started work on a new $2 million facility. . . . . Menasco Manufacturing Co. plans a $5 million facility in the Dallas-Fort Worth, Tex., area.

* * *

Fruehauf Trailer Co. has announced a new 4000 Series aluminum dry freight van.

* * *

Southwest Airmotive Co. has launched a jet engine overhaul program at its Dallas, Tex., plant.

Temco Aircraft Corp. has been awarded a new multi-million dollar Air Force contract to provide tooling and manufacture assemblies for the F-100 jet fighter.

* * *

Indianapolis Motor Speedway is resurfacing much of its track with Kentucky rock asphalt.

* * *

Reo Holding Corp. directors have approved terms of a proposed merger with Nuclear Consultants, Inc. Name of resulting company would be Nuclear Corp. of America, Inc.

* * *

Rohm & Haas Co. has completed a new Plastics Research and Development Laboratory at Bristol, Pa. . . . Plastics Div. of Monsanto Chemical Co. has opened a new research building at Springfield, Mass.

* * *

H. K. Porter Co., Inc., has purchased Electric Service Engineering Co.

* * *

Inductotherm Corp. has moved to a new plant at Delanco, N. J.

* * *

Walker Manufacturing Co. has started construction on a new $650,000 addition to its main plant. . . . Nice Ball Bearing Co. is expanding its Phila., Pa., plant. . . . Allis-Chalmers Mfg. Co. plans a $1.8 million expansion program for its Cedar Rapids, Iowa, plant.

* * *

Kaiser Aluminum & Chemical Corp. has completed installation of two 8000-ton extrusion presses at the heavy press plant to be operated for the Air Force at Halethorpe, Md.

* * *

Link-Belt Co. plans to purchase Syntron Co. . . . Hewitt-Robins, Inc., plans to buy W. A. Jones Foundry & Machine Co.

News of the AUTOMOTIVE

Authenticated

BABY TRACTOR

Miniature Kitty Krawler, developed by Farm Aid Tools, does a man-sized job at plowing, mowing, hauling, bulldozing, loading, and grading. Only six ft long, it has three-speed transmission and is powered by an 8-3 hp AEN Wisconsin engine.

De Soto Dealer Organization Now Totals More Than 2100

De Soto Div. has added 134 new dealerships to its organization since the beginning of the year to bring the total to more than 2100. Nearly one-third of the new outlets were opened in the midwest zone.

Millionth Volkswagen Out; Exports Due for Reduction

Volkswagen recently celebrated production of one million automobiles of the same type. It is claimed that this figure has never been previously reached by any European manufacturer.

Advantage was taken of the occasion to announce the relatively unchanged 1955 model. Except for dual exhaust, the flat four-cylinder air-cooled engine remains the same.

The baggage compartment has been increased in size, and the shape of the gasoline tank has been changed. The rear seats have been moved further to the rear, a new steering wheel has been adopted, and the sliding roof and interior body trim have been improved.

The company also announced that domestic prices will be cut and exports reduced. Despite the planned cut in export shipments for the purported purpose of assuring quicker home deliveries, Volkswagen still hopes to sell 35,000 cars in the U. S. this year.

MASERATI MADE FOR SPORT OR COMPETITION

Furnished with a rigid tubular frame, the Maserati A6GCS is designed in simplest functional form for use as an international sports and/or competition car. The car is powered by a six-cylinder engine with an output of 175 bhp at 6750 rpm.

Stockholders Approve Sale Of Pressed Metals Concern

By a vote of 30 to 1, stockholders of Pressed Metals of America have agreed to sell the assets of the company to Financier Frederick W. Richmond and a group of investors (see AI, Aug. 15, p. 38). The transaction involves creation of a new Pressed Metals Co., to be owned by Richmond and his group, and leaves the stockholders of the old company with the sale money, cash, and bonds, which are not included in the assets to be turned over to Richmond. Purchase price was $7 million.

Under the agreement, the "old" company will be known as "P. R. M. Inc.," which may continue as an investment company. Other possibilities include liquidation and distribution of the assets to the stockholders or acquisition of a new plant.

If the company continues in business, shareholders who wish to withdraw will be given a chance to sell their shares to the company at net asset value. Pressed Metals operates three plants, including Acorn Products Co., a Detroit subsidiary.

Republic Turboprop Fighter Makes Its Inaugural Flight

The Republic XF-84H experimental turboprop fighter plane recently made its first flight successfully at the Air Force Flight Test Center, Edwards Air Force Base, Calif. It is said to be the fastest single-engine propeller-driven plane ever built. The XF-84H is expected to attain even greater speeds when fitted with an afterburner for which it is equipped. It is believed to be the first turboprop plane designed for afterburner augmentation of propeller power.

Powered by an XT-40 Allison turboprop engine developing 5850 eshp at take-off, the new plane has been built to "split" just forward of the canopy in order to take several different forward sections. One of these mounts a three-bladed supersonic propeller built by Aeroproducts Div. of General Motors Corp. Additional supersonic propellers, built by Curtiss Propeller and Hamilton Standard will be tested on the XF-84H in the future.

AND AVIATION INDUSTRIES

Murray Cuts Another Bond With Automotive Industry

Murray Corp. of America has taken a further step to withdraw from the automotive field. The corporation, once one of the biggest automotive suppliers in the country, has sold its Automotive Chassis Frame Div. to Dana Corp., Toledo, O., maker of universal joints, transmissions, gear boxes, axles, and railroad equipment.

The sale included all inventories and assets of the 275,000 sq ft Ecorse, Mich., plant. For some time the plant has been making frames for Ford and Dodge trucks and Mercury cars, but it is not known at present whether these operations would continue under the new management.

Murray last year disposed of its automotive body operations following the loss of contracts from several car companies. It has since been diversifying into non-automotive fields.

Ford Raises Retirement Pay For Its Salaried Personnel

Ford has announced an improvement in the retirement pay for salaried employees. Under a new non-contributory plan, salaried workers now will get $2.25 a month for each year of service, and maximum monthly retirement payment will be $90 after 40 years of service. Previously, the company paid $1.75 a month for a maximum monthly retirement pay of $52.50.

Under the improved contributory plan, an employee making an average base salary of $500 a month for 40 years would draw benefits of $156 a month on retirement. The age 50 requirement is eliminated in the contributory plan, and the 15-year service requirement now is seven years. The company also announced an improved medical-surgical, life and disability insurance program for salaried employees.

AIR DEPOT HANDYMAN

Luggage carry-all, introduced by United Air Lines at seven major terminals, is a converted Kaiser-Willys Jeep truck with wheelbase extended 15 in. Although designed for fast ramp handling of baggage, it hauls mail, express, freight, and also serves as tow truck for cargo carts.

Mitchell-Bentley To Build New Body Plant In Owosso

A new plant for production of automobile bodies will be built by Mitchell-Bentley Corp. in Owosso, Mich., to replace a building damaged by fire last winter. When completed, the new plant will employ 1000 persons, it was reported.

Low Weight Among Features Of Special Kenworth Truck

Kenworth Motor Truck Corp., Seattle, recently sold 200 cab-beside-engine trucks to Yellow Transit Freight Lines, Inc. Starting with its new lightweight, functional, high-visibility cab-beside-engine design, Kenworth engineered a specialized truck with a high-horsepower-to-low-weight ratio.

The trucks have chrome manganese heat-treated steel channel frames. The two-axle, single-axle-drive trucks have a two-speed, hypoid double reduction rear axle and a front axle of 11,000-lb capacity. Power is by six-cylinder, turbo-supercharged Cummins JT-600 Diesel engines. Extensive use of aluminum was made in the cab.

GREATEST GAINS RECORDED IN PACIFIC, MOUNTAIN, AND SOUTH ATLANTIC AREAS

Regional Sales of New Passenger Cars

Zone	Region	June 1955	May 1955	June 1954	Six Months 1955	Six Months 1954	Per Cent Change: June over May	June over June 1954	Six Months 1955 over 1954
1	New England	35,327	40,109	37,215	201,757	173,832	−12.10	− 5.07	+16.06
2	Middle Atlantic	125,296	121,825	116,762	672,612	547,909	+ 2.85	+ 7.31	+22.76
3	South Atlantic	67,925	75,463	60,190	437,632	330,086	+12.06	+28.94	+32.51
4	East North Central	165,929	180,145	156,504	999,200	775,022	− 1.90	+ 6.02	+24.02
5	East South Central	33,861	29,533	29,291	171,575	140,407	+14.65	+15.60	+22.20
6	West North Central	58,958	61,871	55,330	305,788	270,029	− 4.71	+ 6.56	+11.06
7	West South Central	72,812	60,638	58,469	310,924	267,363	+20.08	+22.44	+16.29
8	Mountain	24,015	21,756	17,783	110,024	82,989	+10.38	+35.04	+32.56
9	Pacific	77,249	77,884	55,347	407,107	269,346	− .82	+39.57	+51.16
	Location Not Determinable			882		1,837			
	Total—United States	681,372	681,304	566,753	3,519,629	2,816,800	+ 3.03	+14.18	+24.95

States comprising the various regions are: Zone 1—Conn., Me., Mass., N. H., R. I., Vt. Zone 2—N. J., N. Y., Pa. Zone 3—Del., D. of C., Fla., Ga., Md., N. C., S. C., Va., W. Va. Zone 4—Ill., Ind., Mich., Ohio, Wis. Zone 5—Ala., Ky., Miss., Tenn. Zone 6—Iowa, Kan., Minn., Mo., Neb., N. D., S. D. Zone 7—Ark., La., Okla., Tex. Zone 8—Ariz., Colo., Ida., Mont., Nev., N. M., Utah, Wyo. Zone 9—Cal., Ore., Wash.

News of the AUTOMOTIVE

1955 RETAIL CAR SALES BY PRICE GROUPS*

Number of Cars

Price Group	June 1955 Units†	June 1955 % of Total	June 1954 Units†	June 1954 % of Total	Six Months 1955 Units†	Six Months 1955 % of Total	Six Months 1954 Units†	Six Months 1954 % of Total
Under $2,000	379,572	56.10	370,101	63.31	1,912,024	54.24	1,679,319	59.86
$2,001 to $2,500	210,062	31.04	138,125	23.25	1,105,262	31.35	710,121	25.32
$2,501 to $3,500	69,447	10.26	59,360	9.99	404,703	11.48	301,137	10.74
Over $3,500	17,565	2.60	20,512	3.45	103,403	2.93	114,343	4.08
Total	676,636	100.00	594,188	100.00	3,525,392	100.00	2,804,920	100.00

Dollar Volume of Sales

Price Group	June 1955 Dollars	June 1955 % of Total	June 1954 Dollars	June 1954 % of Total	Six Months 1955 Dollars	Six Months 1955 % of Total	Six Months 1954 Dollars	Six Months 1954 % of Total
Under $2,000	$ 719,814,514	48.77	$ 685,457,177	55.09	$3,629,408,652	46.66	$3,059,345,892	51.44
$2,001 to $2,500	490,038,605	33.20	316,633,196	25.44	2,578,770,640	33.16	1,623,940,331	27.31
$2,501 to $3,500	195,168,548	13.22	162,290,789	13.04	1,146,674,698	14.75	822,797,727	13.84
Over $3,500	70,937,593	4.81	80,009,667	6.43	420,772,501	5.41	440,833,326	7.41
Total	$1,475,957,260	100.00	$1,244,390,809	100.00	$7,775,627,491	100.00	$5,945,917,166	100.00

*—Calculated on basis of new car registrations, as reported by R. L. Polk & Co., in conjunction with advertised delivered price at factory of four-door sedan or equivalent model. Does not include transportation charges or extra equipment.
†—New registrations of American made cars only. Does not include imported foreign cars.

New Cross Plant to be Keyed to Automation and Atomic Age

The Cross Co. has revealed plans for construction of a $4 million factory and office building that is designed to double production capacity and to provide an 80 per cent increase in employment. At the same time, the new plant will be one of the first in the Detroit area capable of offering resistance to atomic radiation.

Milton O. Cross, Jr., president of the concern, stated that demand for Cross automation machinery and special machine tools has risen to the point where production capacity must be doubled. Cross production already has been increased 10 times in the last 10 years.

The new plant is being designed for an annual output of $20 million, which is about the company's present capacity. More than 100 engineers and 300 skilled craftsmen will be added to the Cross production team. Special 25-ton cranes are being designed to provide the best in materials handling equipment.

The plant is to be located on a 65-acre plot on 14 mile Road and Grosbeck Highway, 16 miles from downtown Detroit. It will thus be relatively safe from bomb destruction in the event of another national emergency.

The walls of the new plant are being made of materials that will resist radioactive rays. Waterpond roofs will appear as small lakes when viewed from the air. Provision is being made for battery-operated, emergency lighting. An automatic air-raid warning system is being installed and complete equipment for microfilming and storing all records.

A $650,000 contract for 2370 tons of steel framework has been awarded, and ground has been broken. The big job of transferring operations to the new plant is scheduled for the summer of 1956. The present plant sites on Bellevue Ave. will be sold.

FUEL SAVERS

In an effort to get more miles per gallon from automobile engines, the General Motors Research Laboratories Div. is testing hundreds of engine combustion chamber shapes and designs on single-cylinder test engines. Here are a few of the various experimental chamber and piston combinations that have been tried in the laboratories. The more promising ones are incorporated later in V-8 experimental engines for road tests to determine how economically they use fuel.

Van der Horst to Establish Plant Facilities in Chicago

Van der Horst Corp. has announced that it will establish plant facilities in Chicago. The corporation has purchased an industrial property located at 2610 South Shields Ave., Chicago. The property consists of 37,000 sq ft of manufacturing facilities and 15,000 sq ft of yard space.

Van der Horst, one of the world's largest heavy industrial electroplating organizations, has additional plants in Olean and Salamanca, N.Y.; Terrell, Tex.; and Hilversum and Zwolle, Holland. An increased demand in the midwest for Van der Horst's patented Porus-Krome process is credited by the corporation for necessitating the establishment of the new plant.

Initial installations at the Chicago plant will provide for a 48,000 ampere hour plating capacity. The new plant is expected to be in production soon.

AND AVIATION INDUSTRIES

Bell Said Ready to Take Over Chevrolet Plant Near Buffalo

Bell Aircraft Corp. may take over the former Chevrolet aviation-engine plant at 2450 Kenmore Ave. in Tonawanda, N. Y., for the production of new kinds of military airplanes. The idle plant is owned by the Air Force, but Chevrolet operated it for the Government during World War II and again during the Korean War.

It is reported that Bell wants at least part of the plant for the production of planes. Included is a new reconnaissance bomber it has designed for the Air Force.

Airbag Suspension Systems Under Study by Car Makers

Airbag suspension for passenger cars may not be as far away as originally supposed. Several companies are said to be working on it, and progress apparently is being made.

One advantage claimed would be a level ride regardless of passenger load. Installation would probably require an air compressor, which also might be used for operating other accessories.

Crane Packing Co. Home Nears Completion in Chicago Suburb

Ground has been broken on the outskirts of Morton Grove, Ill., for two new one-story buildings which will house extensive research and laboratory operations for Crane Packing Co., as well as offices and a cafeteria. Signaling the culmination of a three-year program, these buildings covering 46,500 sq ft in area are in addition to a 126,000 sq ft one-story factory building already in operation.

When the entire project is completed early in 1956, Crane Packing Co. will have a new 17-acre home site for its nation-wide manufacturing and industrial service operations. The company produces mechanical seals, mechanical packings, products made of DuPont Teflon, lapping machines, and pipe joint and thread compounds.

Approximately 5000 sq ft of this space will be devoted to laboratory research and testing for a two-fold purpose. Design and development work will be carried on in the electronic, nuclear, and other fields Second, methods, techniques, and new advancements in industrial service will occupy an important role.

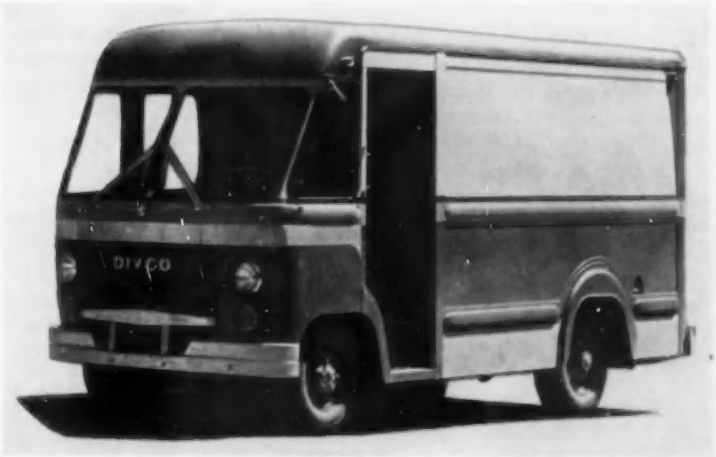
Another 32,000 sq ft of space will accommodate the sales, executive, and general offices. For the past 35 years, Crane Packing Company's home facilities have been located in the Cuyler Ave., Belle Plaine, and Ravenswood block in Chicago, Ill.

FOREIGN TRUCK SALES LEAP IN HALF OVER 1954
1955 New Truck Registrations*

Arranged by Makes in Descending Order According to the 1955 Six Months Totals

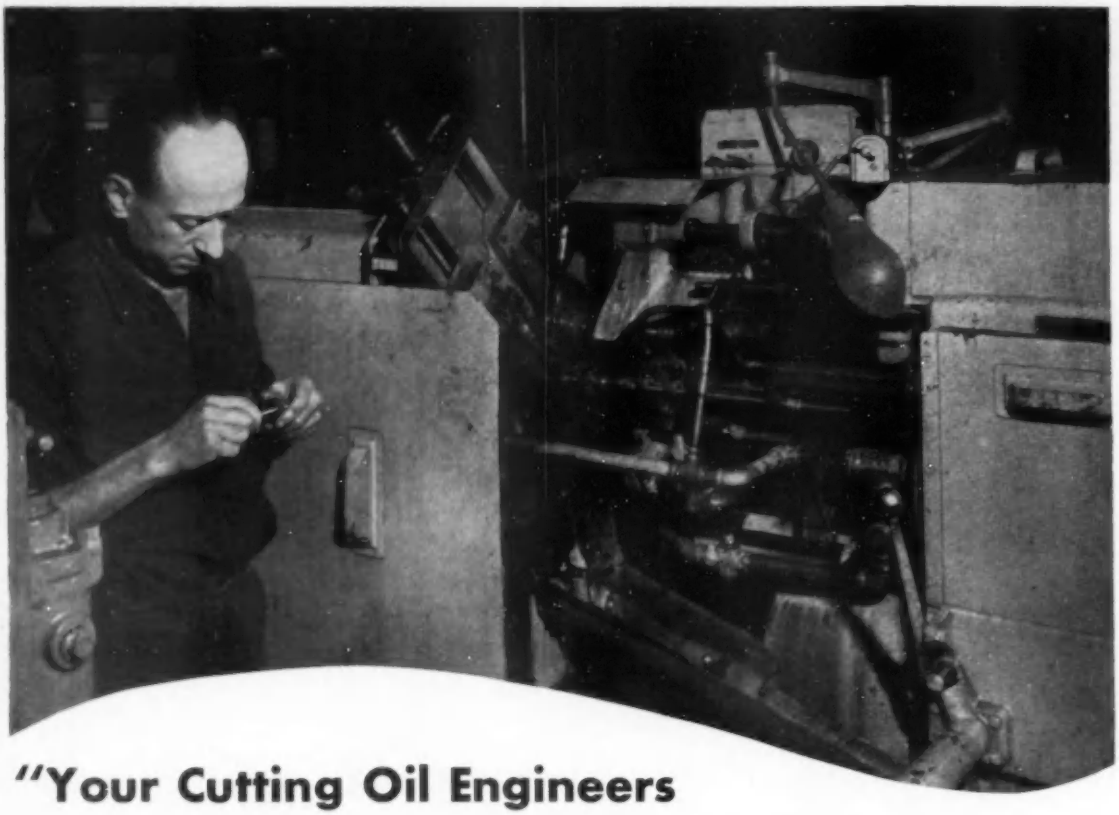
MAKE	June 1955	May 1955	June 1954	SIX MONTHS Units 1955	SIX MONTHS Units 1954	SIX MONTHS Per Cent of Total 1955	SIX MONTHS Per Cent of Total 1954
Ford	24,392	24,630	31,340	140,391	144,726	32.34	33.39
Chevrolet	34,144	29,583	31,284	139,458	152,207	32.12	35.12
International	9,422	8,945	7,176	51,568	41,834	11.88	9.65
G.M.C.	6,740	6,909	5,854	33,090	35,793	7.62	8.26
Dodge	6,387	5,214	5,033	32,346	31,083	7.45	7.17
Willys Truck	1,334	1,381	946	7,965	3,375	1.84	.78
White	1,238	1,173	1,072	6,616	6,214	1.52	1.43
Studebaker	1,060	1,061	1,013	5,863	5,670	1.36	1.31
Mack	1,005	1,081	808	4,946	3,042	1.14	.70
Willys Jeep	333	795	611	4,642	3,635	1.07	.84
Diamond T	324	312	224	1,729	1,406	.40	.32
Divco	343	346	223	1,671	1,268	.38	.29
Reo	278	232	225	1,328	1,235	.31	.28
Brockway	100	85	107	516	611	.12	.14
Kenworth	98	83	86	497	348	.11	.08
Peterbilt	52	48	35	221	180	.05	.04
F.W.D.	18	22	17	115	237	.03	.05
Federal	5	4	23	24	195	.01	.04
Misc. Domestic	31	57	35	333	334	.08	.08
Foreign	181	157	48	746	127	.17	.03
Total—All Makes	90,006	82,066	85,859	434,113	433,819	100.00	100.00

* Based on data from R. L. Polk & Co.



DOOR-TO-DOOR DELIVERY TRUCK OF COE DESIGN

Divco Corp. has placed on the market this new large-capacity parcel delivery and cartage truck that is available in either 130 or 115-in. wheelbase sizes. The former weighs 5800 lb and has a GVW of 8000 to 12,000 lb depending on tires and springs. Powered by a Divco Super 6 engine with an output of 114 bhp at 3500 rpm and a four-speed synchro-mesh transmission, it is 18½ ft long and 108 in. in height.



"Your Cutting Oil Engineers know their way around a Job Shop"

—reports Kennedy Automatic Products Co., Marshall, Michigan

KENNEDY AUTOMATIC PRODUCTS COMPANY is known throughout Michigan for its fine job work. The plant keeps a variety of machine tools busy — lathes, grinders, automatics and others—and works brass, copper and aluminum in addition to various steels and alloys.

Naturally, no single cutting oil can handle all this different work and metal. However, since 1947, Kennedy has relied on Texaco Lubrication Engineering Service for guidance—with highly satisfactory results. Says Kennedy—

"Your cutting oil engineers know their way around a job shop. Their recommendations for the proper oil to use and the proper way to use it have been invaluable in helping us to solve our many machining problems. Thanks to them we have been able to do most of our work with Texaco Cleartex Oil, which does an outstanding job as both cutting fluid and machine lubricant for our automatics. Texaco Cleartex Oil gives us good tool life and excellent finish."

There is a complete line of *Texaco Cutting, Grinding, Soluble and Hydraulic Oils* to help you do all your machining better, faster, and at lower cost. Let Texaco Lubrication Engineering Service help you use them profitably. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York 17, New York.

TEXACO **TEXACO** CUTTING, GRINDING, SOLUBLE AND HYDRAULIC OILS

TUNE IN . . . TEXACO STAR THEATER starring JIMMY DURANTE on television . . . Saturday nights, NBC.

Men in the News

American Bosch Arma Corp. — V. Charles Schorlemmer has been named administrative vice-president.

Gould & Eberhardt, Inc.—**H. Ezra Eberhardt** has been elected chairman of the board and treasurer; **Gustave E. Spies,** president; **F. G. Eberhardt,** vice-president; **W. C. Eberhardt,** vice-president; **W. H. Gardner,** secretary; and **F. D. Smith,** assistant secretary and assistant treasurer.

Canadian Kenworth, Ltd.—**Donald F. Pennell** has been appointed vice-president and general manager.

U. S. Rubber Co.—**Wallace E. Cake** has been elected vice-president, member of the board of directors, and member of the executive committee.

Abrasive Machine Tool Co.—**Walter P. R. Sceeles** has been promoted to assistant to the president, and **Joseph T. Vinbury** is now general sales manager.

American Bosch Arma Corp.—**Leslie E. Neville** has been appointed director of public relations and advertising.

White Motor Co.—**Wallace L. Pepin** has been promoted to director of service.

Axelson Mfg. Co., Milling Machine Div.—**Abe Haglund** is now sales manager.

Emhart Mfg. Co. — **Francis R. O'Leary** has been elected executive vice-president.

Adamas Carbide Corp.—**Edward L. Dreyer** has been named president.

Champion Spark Plug Co.—**Clyde W. Sweet** has been named purchasing agent, and **William J. De Sana** has been made traffic manager.

Marman Products Co., Inc.—George A. Seaver has been named vice-president and general manager.

Joseph T. Ryerson & Son, Inc.—Merle A. Miller has been elected vice-president and treasurer, and Raymond N. Carlen has been chosen vice-president.

Clevite Corp.—**James L. Myers** has become chairman of the board of directors; **William G. Laffer,** president; and **Willard W. Brown,** president of the Cleveland Graphite Bronze Div.

Du Pont Co.—**Wallace E. Gordon** was named director of the Advertising Dept.

Plymouth Div., Chrysler Corp.—**Charles W. Craig** has been named director of public relations.

Niles-Bement-Pond Co. — Alexander S. Keller has rejoined the organization as a vice-president and as general sales manager of the Pratt & Whitney Div.

Alan Wood Steel Co.—**Perry L. Francis** was elected vice-president in charge of marketing; **William E. Boger,** vice-president in charge of operations; **Howard W. Read,** vice-president and comptroller.

Parker Appliance Co.—**J. N. Wolfram** has been appointed engineering manager.

Hydro-Aire, Inc. — **Laurence C. Craigie** has joined the company as vice-president.

(*Turn to page* 319, *please*)

Bendix Products Div., Bendix Aviation Corp. —Edward E. Hupp was named executive sales engineer.

Warner Electric Brake & Clutch Co. — R. F. Edgar has been appointed industrial sales manager.

Necrology

Frank A. Seiberling, 95, founder of Goodyear Tire & Rubber Co. and retired chairman of the board of Seiberling Rubber Co., died Aug. 11, at Akron, O.

Hardage L. Andrews, 65, president of Jones & Lamson Machine Co. and a former vice-president of General Electric Co., died Aug. 4, at New York, N. Y.

Donald R. Lowry, 67, president and director of Ingersoll-Rand Co., died Aug. 9, at New York, N. Y.

Ernest F. Watts, 49, vice-president of Binks Manufacturing Co., died recently at Chicago, Ill.

William J. Cameron, 76, close associate of the late Henry Ford and editor of the defunct *Dearborn Independent*, died Aug. 1, at Oakland, Calif.

Charles Bartlett, 65, retired chairman of the board of Vauxhall Motors, died Aug. 10, at London, England.

Francis J. Stokes, 81, founder and chairman of the board of F. J. Stokes Machine Co., died Aug. 1, at Philadelphia, Pa.

Donald S. Devor, 66, retired vice-president of Houdaille-Hershey Corp. and one-time vice-president of Timken-Detroit Axle Co., died Aug. 11, at Detroit, Mich.

George W. Lucas, 46, supervisor of carbide materials and process engineering for Carboloy Dept. of General Electric Co., died recently, at Detroit, Mich.

Stuart R. M. Thomson, 50, advertising manager for the American Trucking Associations, died recently, at Bryn Mawr, Pa.

Unusually Tough BOLTS!

As vital parts of tractors, dirt movers and other heavy-duty equipment, these big bolts can take a terrific beating and still hold fast. They will resist shear, fatigue and impact that no common bolts could withstand without wear or breakage. Special heat-treatment produces this unusual toughness, making these National bolts capable of enduring extremely severe stresses.

By cold heading and special production methods, National can turn out many special headed-and-threaded fasteners which, like these bolts, solve special problems or reduce costs. Depend on National's extensive manufacturing facilities and complete line of fasteners for your needs.

Write for a free copy of National's "Special" fastener booklet.

Representatives in:

Chicago	Indianapolis	Philadelphia
Cincinnati	Kansas City, Mo.	Portland
Dallas	Lansing	Rochester
Denver	Milwaukee	San Francisco
Detroit	Minneapolis	St. Louis
	New York	

MANUFACTURERS OF PHILLIPS SCREWS

THE NATIONAL SCREW & MFG. COMPANY
CLEVELAND 4, OHIO
Pacific Coast: National Screw & Mfg. Co. of Cal.
3423 South Garfield Ave., Los Angeles 22, Cal.

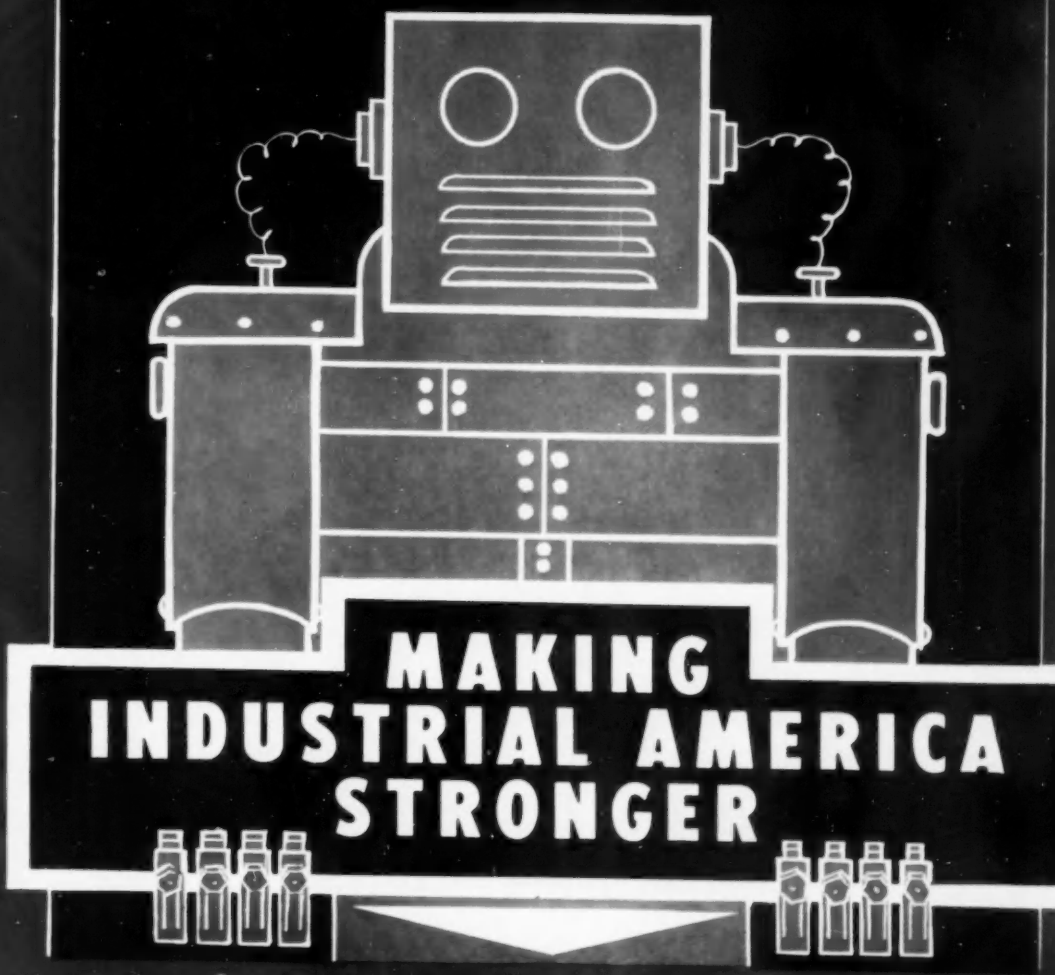
National PRODUCTS

Fasteners Hodell Chains Chester Hoists

AI

MACHINE TOOL & PRODUCTION EQUIPMENT ISSUE—1942

AUTOMOTIVE INDUSTRIES



MAKING INDUSTRIAL AMERICA STRONGER

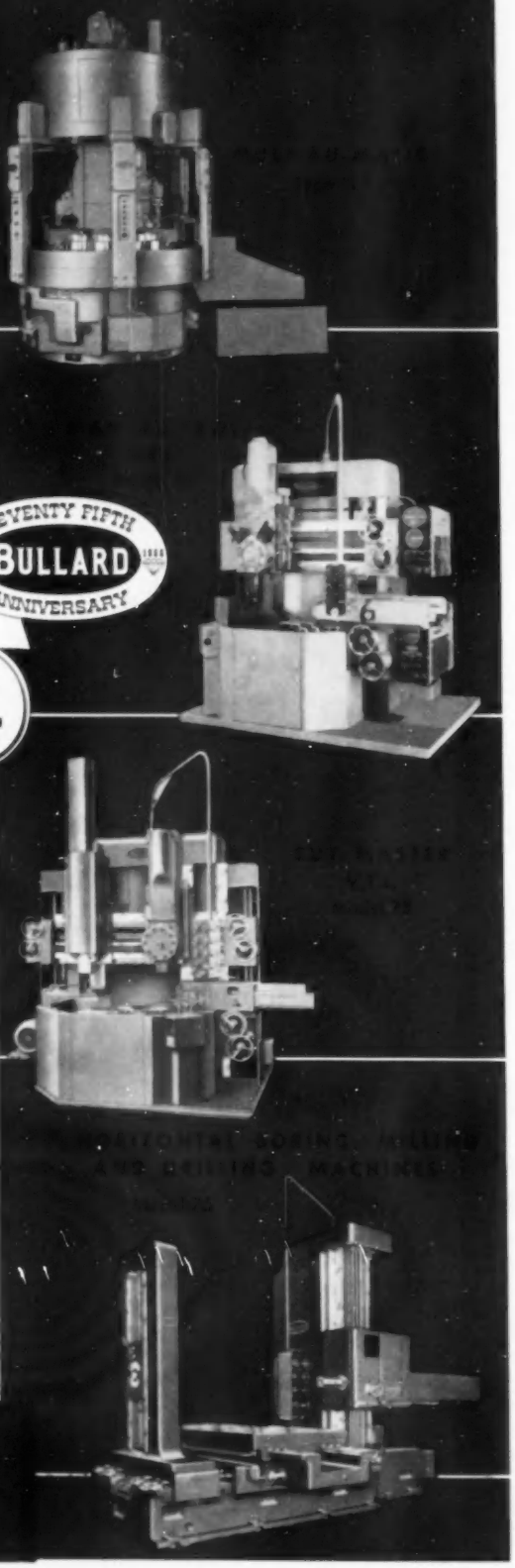
Be sure to see Today's

MOST MODERN MACHINE TOOL *line . . . . .*

at BOOTH

1213

SEVENTY FIFTH
BULLARD
ANNIVERSARY



You haven't really "Seen the Show"...

unless you visit The Bullard Exhibit for here are displayed not merely re-designed but completely new machines that take full advantage of modern technological advances including single station Pendant Control.

Don't Miss It!

The Bullard Co.

Bridgeport 2, Connecticut

Making Industrial America Stronger

MAMMOTH Machine Tool Show, Largest Machinery Exhibit in History, Opens September 6 in Chicago's International Amphitheatre. This Multi-Million Dollar Exposition on 10 Acres of Indoor Floor Space Will Include 400 Different Types of Machine Tools. Among Special Attractions Will Be "Hall of Giants."

Big Production Engineering Show on Navy Pier Complements Machine Tool Show. Coliseum Machinery Show to Operate Same Days at Chicago Coliseum.

By James R. Custer

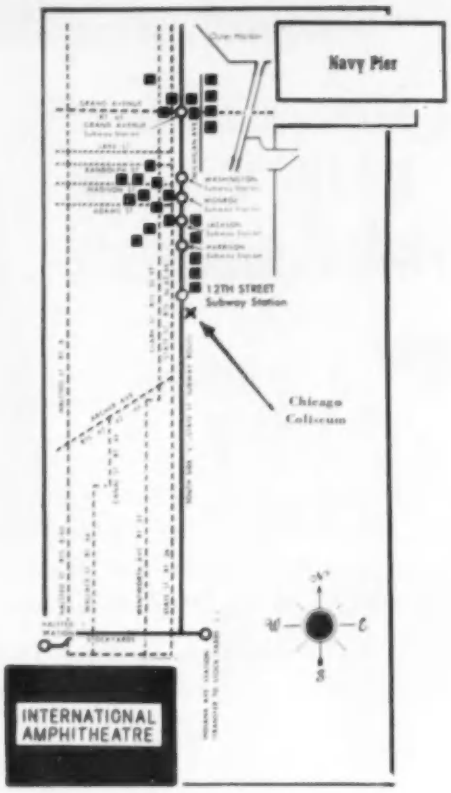
IN the midst of record-breaking business activity, an auspicious event at hand is the huge Machine Tool Show that opens September 6 in the International Amphitheatre at Chicago. This show is sponsored by the National Machine Tool Builders' Association and is the first to be held by that organization since the highly successful Machine Tool Show in 1947 at the Dodge-Chicago plant, now the J-57 turbojet engine plant of the Aircraft Engine Division, Ford Motor Co. The eight-year interval in itself is assurance that the machine tool builders will make the most of this opportunity to display their outstanding developments that they have had "under wraps" for this event.

Operating simultaneously in the same city will be the Production Engineering Show on the Navy Pier and the Coliseum Machinery Show (Metalworking Machinery and Equipment Exposition) at the Chicago Coliseum. All three shows will end on September 17. They will be closed Sunday, September 11.

Through the years the metalworking industries represented at these shows have been in the vanguard of making America stronger. They will dramatize in a spectacular way their newest developments, which will attest to their role of achievement today and for the future in maintaining the United States as the greatest industrial nation in the world.

It is to these great industries that this issue of AUTOMOTIVE INDUSTRIES is dedicated, particularly because of their progress hand-in-hand with the automotive and aviation industries. In this section, "Making Industrial America Stronger," is presented special editorial material of timely interest and in keeping with that theme. The intricacies of coordination required of manufacturer and purchaser in developing today's complex mass production equipment are discussed in the first article.

Next is a chronology of the machine tool and other production industries reviewing their major achievements during the past 100 years. The remarkable increase that has been accomplished in machine tool productivity is revealed in a special article. Another feature is a report on current automation developments, followed by a survey of the metals market. The next three sections preview many of the hundreds of new machines and other equipment to be displayed at the three shows. Some companies will not announce their new machines until after the opening of the shows and descriptions of them together with other important show activities will be



throughout the world. Because of its tremendous and wide variety of machine tools on display, some 400 different types, the Machine Tool Show will be the main attraction. Attendance at this world's largest machinery exposition is expected to go over the 100,000 mark. The MTS comprising 175 exhibitors will occupy both the International Amphitheatre and the new Exposition Hall alongside it, the total available space amounting to nearly 10 acres.

On display, with many in operation, will be over 2000 metal cutting and metal forming machines having a total value of more than $20 million. It is estimated that the cost of moving these machines from freight cars and trucks, setting them up, and afterwards removing them will be $1 million. By the time the show opens 3000 workmen will have been employed doing this work.

The show will feature the largest display of heavy machines ever assembled under one roof with approximately 523 machines in this category, including newly-designed transfer machines embodying the most advanced hydraulic and electrical control systems, enormous broaching machines, presses weighing up to 108 tons, and numerous others. Shipments of machines to Chicago started as early as June. So that the work areas of big machines can be viewed easily, some have been set up accordingly in deep concrete-lined pits and others have elevated platforms for the spectators.

One machine tool company states that the machines in its exhibit have a value of over $1 million. So impressive in size is the equipment installed in the Amphitheatre Arena that this section is being referred to as the "Hall of the Giants."

Several companies, non-members of the NMTBA, have booths at the Machine Tool Show in the second floor North Hall of the Amphitheatre and will provide service, such as lubricants, hydraulic fluids, cutting fluids, metal cleaners, tool grinding, and others. These companies include E. F. Houghton & Co., F. E. Anderson Oil Co., Carboloy Department of General Electric Co., Kennametal, Inc., Sun Oil Co., and Socony Mobil Oil Corp. Their booths also will feature their latest developments.

AUTOMOTIVE INDUSTRIES will have a special display at Booth No. 204 in the second floor North Hall.

Production Engineering Show Highlights

Approximately 180 exhibitors will be in the Production Engineering Show during its 11-day operation on the Navy Pier. This show is being conducted by Clapp & Poliak, Inc., which also is managing the Machine Tool Show. In addition to providing bus service between these two expositions and downtown hotels, helicopter transportation between the two expositions also will be available.

Emphasis at the Production Engineering Show will be on cost reduction and automaticity. The types of equipment on display will be in the following eight categories—monitoring, control mechanisms, preci-

(*Turn to page 276, please*)

SHOW TIMETABLES

MACHINE TOOL SHOW
International Amphitheatre
*Sept. 6-17
Daily Hours—10:00 AM to 5:30 PM

PRODUCTION ENGINEERING SHOW
Navy Pier
*Sept. 6-17
Daily Hours—1:00 PM to 10:00 PM

COLISEUM MACHINERY SHOW
(Metalworking Machinery & Equipment Exposition)
Chicago Coliseum (1513 S. Wabash Ave.)
*Sept. 6-17
Daily Hours—10:00 AM to 10:30 PM

*—Closed Sunday, Sept. 11

summarized in a special article to be published in the October 1 issue of AUTOMOTIVE INDUSTRIES. Lists of exhibitors for the three shows are published elsewhere in this issue.

During the two weeks Chicago will be the mecca for company executives and production engineers

COORDINATION

in Developing Huge, Complex Machine Tools and Other Production Equipment

By Joseph Geschelin

In the main, the special machines and transfer equipment going into the automotive industries are procured on a strictly competitive basis. From a sampling we have made recently, it is apparent when such new equipment is contemplated the automotive manufacturer invites bids from a selected group of specialists. The starting point is the basic design of the part in the form of a part drawing, some information as to dimensional tolerances and surface finish specifications, together with the desired production per hour.

From this point on, the contestants are required to study the requirements and, based upon their own experience, to recommend an operational sequence that would meet the specifications most acceptably. This operational sequence, eventually, circumscribes the design of the particular machine. Usually, the customer will go over the competitive designs and select the one that seems best for the particular job, in terms of process, quality, cost economy, and evaluation of the design and maintenance characteristics of the specific machine. In the main, therefore, it is recognized that since the machine tool builder must accept responsibility for the installation, he is also given a relatively free hand in its conception as well as the details of processing a given part.

Once the customer has made his decision and has accepted a particular make of special machine, the successful bidder initiates a new chain of cooperative effort—contacts with the customer's master mechanic and process engineers to finalize equipment design details; and at this stage may recommend modifications in product design to achieve maximum cost economy as well as to take advantage of special techniques.

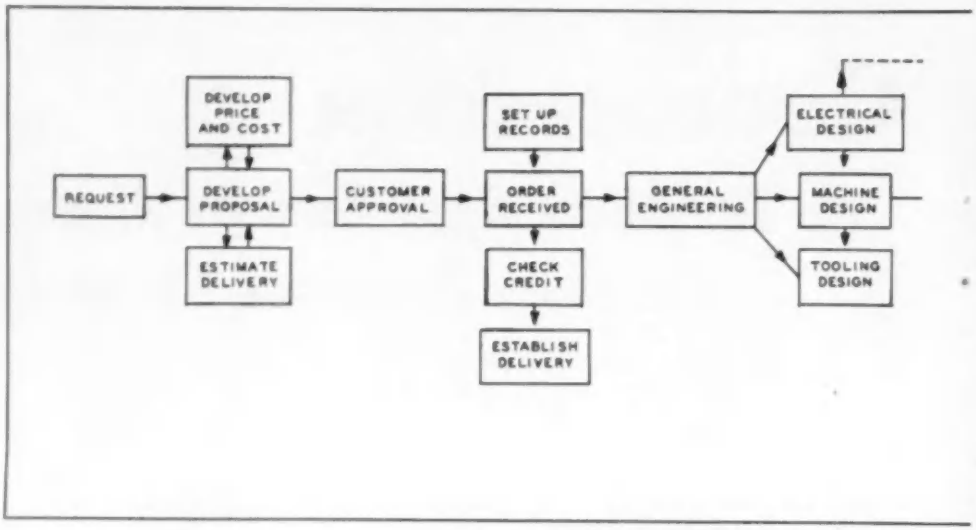
Since the inception of modern transfer machines their producers have had to accept responsibility for the operation of the equipment in its entirety. Today there is no divided responsibility. The machine tool builder must vouch for everything on the machine, including such special accessories as hydraulics, electrical and electronic components, inspection devices.

This new concept makes it imperative to have cooperative action among the machine tool builders and suppliers of accessory equipment, including special tooling, gaging, fixturing, conveyors, and many other special items. All of these elements must be brought together to assure proper functioning as well as durability.

We have found in many quarters—both on the side of the user and the machine tool builder—an acceptance of the principle that in cases where special tooling is involved, such as: milling cutters, boring bars, reamers, etc., the tooling becomes the focus of attention and exerts a miximum effect upon the design of a given station. It is pointed out, for example, that milling requires special study to determine the right design of the cutter and inserts. In some cases, the direction and locus of the cut has a great deal to do with obtaining minimum area of cut, hence a minimum spindle horsepower for that station. In all cases, the tool design engineer makes a thorough analysis of each operation to assure maximum tool life and thereby reduce down time for tool changes. Such analysis frequently indicates the necessity for breaking down operations into two or more stages to conserve tool life. This is especially true of deep hole drilling.

In any event, among progressive machine tool builders, the tooling and fixturing and clamping are given first attention, then the station design built around the best procedure. (*Continued next page*)

MAKING INDUSTRIAL AMERICA STRONGER



FLOW CHART SHOWING STEPS

Such concern with basic tooling exerts a marked influence upon the design of the machine in many respects. It determines spindle sizes—to accept standard catalog tools where possible; it determines speeds and feeds and depth of cut; it determines spindle horsepower for each station. It also goes beyond these considerations. For example, we inspected an enormous transfer machine that was under construction at the time this article was prepared. One section was designed to handle the rough- and semi-finish boring of cylinders for a new V-8 engine block. Because of the nature of dimensional tolerances and the necessity for accurate axial alignment and bore roundness, the machine tool builder had imparted uncommon massiveness and rigidity in the structure. Maximum rigidity has become a vital element in modern machine tool design not only to assure accuracy but to provide for trouble-free operation.

The transfer machine of today has become an amazing complex of tools, fixtures, suitable clamping methods, machine design, transfer bars and other types of conveyors associated with the machine, chip handling, inspection devices, rollovers, tool life indicators, provision for cutting fluids, oil filtration, refrigeration of cutting fluids where necessary, maintenance of JIC standards, and provision for preventive maintenance. This is a lengthy statement but it defines only part of the complex.

Obviously, the overall design of such equipment requires specialists. And the major machine tool builders have them. Among such specialists are: tool design, machine design, hydraulics systems design, electrical and electronics systems design. They constitute the team that works together on a given project.

Obviously, too, there is a new kind of coordination among the various people involved in a major design project. These include: suppliers of cutting tools; suppliers of gaging and inspection devices; suppliers of conveyor systems; suppliers of hydraulics and electronic elements; and others.

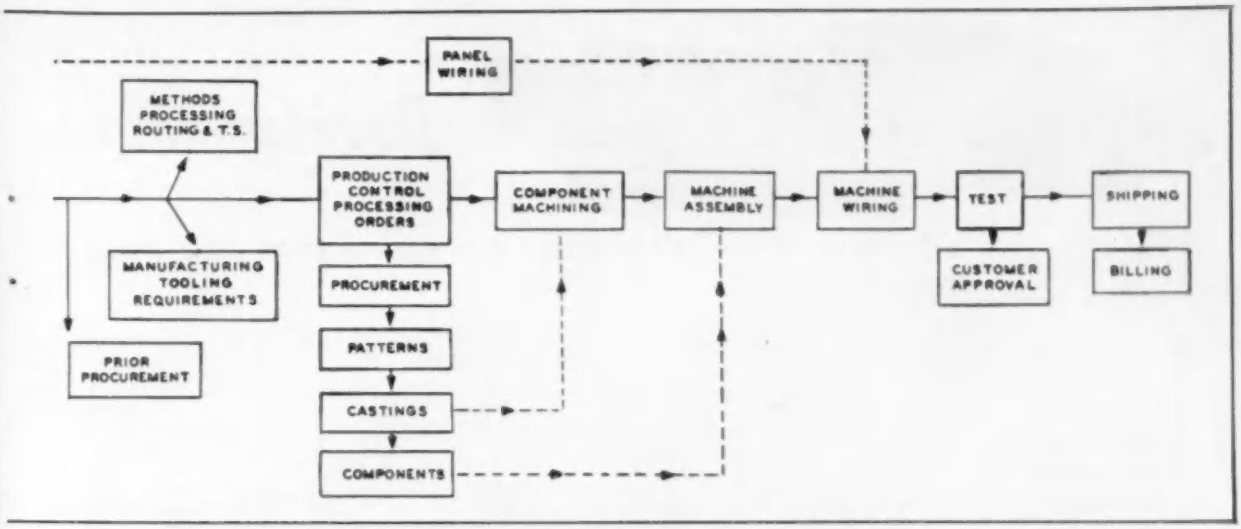
Coordination of all of these elements within the organization of the machine tool builder and his suppliers becomes a new contribution to the art.

There is an interesting trend in transfer machines in keeping with modern manufacturing procedures. It appears now that certain types of transfer machines may well combine machining with light assembly stages. And, depending upon the nature of the part, the assembly stages may well involve special process steps such as seam welding and spot welding, and induction hardening as well. It all depends upon the design of the part and its requirements.

Mention was made briefly of automatic inspection stations. Considering the relatively simple probing gages to check hole depth as a starting point, some recent transfer machines include automatic air checking stations to verify the oil tightness of long galleries, and electronic gaging of cylinder bores. There seems to be no limit to what can be accomplished through the ingenuity of the machine tool designers.

Recently announcement was made of a machinability computer, an electronic brain unit of analog type. Designed to accommodate a maximum number of major variables involved in metal cutting, the device may be an invaluable aid to the machine tool builder in investigating the maximum possibilities of speeds and feeds, spindle sizes, as well as horsepower and rigidity. In the hands of capable tool designers, the device may well point to maximum machine and tool design so as to get the most out of a given machine tool.

Down time is of vital importance to the user. Hence anything that can improve reliability is a major goal.



IN THE GENERAL PROCESSING OF TRANSFER MACHINES

At present, devices for calibrating tool life give valuable aid in preventing down time for tool changes. Other machine tool builders rely upon signal lights that warn of tool wear but without shutting down the machine. One machine tool builder has developed a device for automatically advancing the tool slide to take up wear at the tool tip. Others have analogous devices of their own, such as the Barber-Colman automatic hob shifter.

Another recent device calculated to reduce down time is a special miniaturized circuit diagram of the entire electrical system, making it a simple matter for a maintenance man to locate a fault anywhere in the system in a matter of minutes.

Still awaiting economic solution is some practical device for providing a limitation on the torque of spindles, particularly for drills and reamers. If and when a practical device becomes available, it will prevent untimely wear as well as breakage of drills by automatically releasing the spindle in the event of hard spots in the work or tool point dulling. Industry is waiting eagerly for something along this line.

Granting that machine tool builders keep close contact with their customers, they must also keep in touch with automotive product advances—before they become a reality. To put it simply, machine tool builders must visualize long range trends that may have a marked effect upon product design and machine tool design. Here is one example of what we mean. Consider the gas turbine. Will it become a factor in the automotive field? If so, will it come first on trucks and buses or in passenger cars? It makes a big difference whether the gas turbine will make its first appearance in mass production or small lot production.

In our appraisal of the situation, it would appear that if and when the gas turbine might become a mass production reality, it would change the engine building picture in a revolutionary manner. For one thing, no existing V-8 engine plant would be capable of producing the gas turbine. Its introduction, therefore, would bring with it an entirely new wave of plant construction and special equipment design and installation.

At the present writing no one can say with certainty that the gas turbine will or can displace the modern high compression engine. The best estimate as to its emergence is around 10 years from now. In the interim, a lot of V-8's will be built.

Meanwhile, the automotive industries continue to make history with radically new developments. What they may be next year, we don't know. The only sure thing is that everyone concerned with machine tool building must keep close contact with the automotive producers so as to anticipate the developments that may alter the shape of things to come.

Mechanical handling systems also exert an influence upon machine tool design. In the past, the customer worried about conveyors and mechanical handling as something that was superimposed on machine tools. Today, the transfer machine is a complex of mechanical handling systems all built in as part of it. Consideration must be given to the type of automatic handling. Will it be by means of transfer bars or rise-and-fall mechanism; or does the design of the part, as well as its material, demand a pallet type conveyor on which it rides on a single fixture? These considerations effect the design of the machine markedly.

Chip handling conveyors, automatic connections with other transfer machines, and other related steps in the process all require close coordination of conveyor suppliers with machine tool builders.

Truly the modern concept of transfer equipment takes exceptional skills and specialization, and demands closer coordination with all manner of suppliers.

100 Years of Progress in Development

Machine Tool Show and Allied Expositions

National Machine Tool Shows

1927—Cleveland
1929—Cleveland
1931—(cancelled)
1935—Cleveland
1939—Cleveland (cancelled due to WW II)
1947—Chicago
1955—Chicago

Above—The great Crystal Palace Exhibition opened in London in 1851. Demonstrations of "interchangeable" firearms by Robbins & Lawrence and other American gun and machinery makers "sparked" widespread adoption of American machine tools and methods immediately after this big show. Right—Example of early interchangeable manufacture exhibited by an American company at the Crystal Palace. These are Robbins & Lawrence pistol parts — all "jigged" to close limits of accuracy.

Do big expositions such as the 1955 Machine Tool Show and Production Engineering Show actually have any deep and enduring influence on world industrial developments? They most certainly do. As a matter of fact, it was a big international exposition opened at the Crystal Palace, London, England, in 1851, which "sparked" a remarkable century of achievement on the part of our own American machine tool industry.

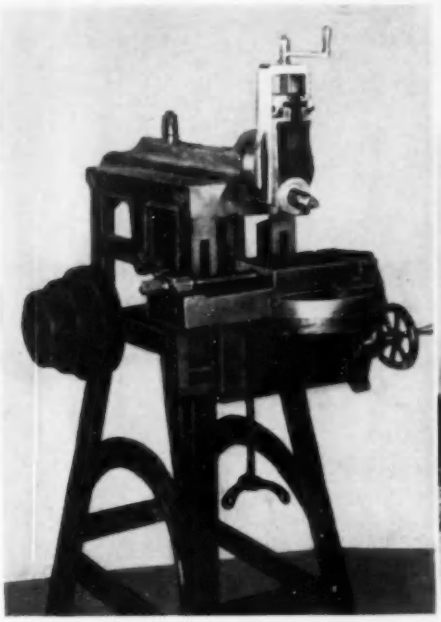
This industry already had been in existence in America in a rather desultory way for more than 50 years. It had been started by Eli Whitney about 1798 as a phase of his interchangeable system of firearms production. From 1798 up into the 1850's, Yankee gunsmiths, clock makers, and sewing machine builders developed increasingly ingenious machine tools for their own use. There was little, if any, "interindustry traffic" in these machine tools in the United States itself. Foreign industrialists meanwhile continued to scoff at this so-called American system of manufacture, even after 1842 when Yankee clock maker Chauncey Jerome's first big shipments of cheap, dependable brass clocks thoroughly jolted the British clock industry.

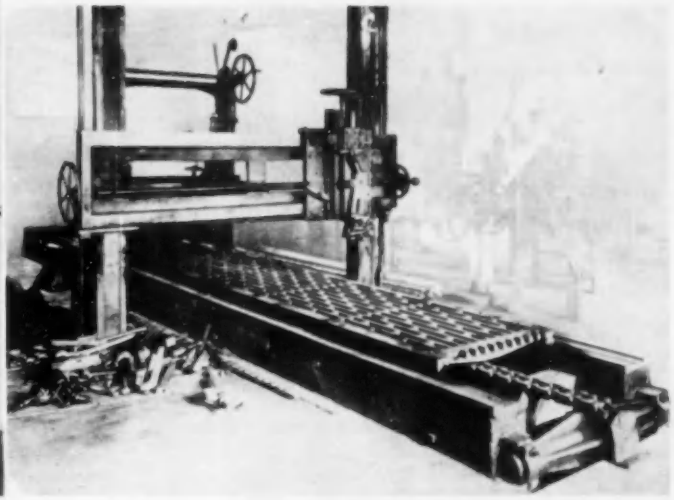
Actually no American machine tools were shown at the Crystal Palace. What aroused the interest of English and continental engineers and ordnance men were several displays of American firearms which had been mass-produced through use of American machine tools. Interchangeability of parts in these guns was dramatically demonstrated by rep-

# of American Metalworking Equipment

Demonstrate Great Contributions by Production Equipment Industries

By Guy Hubbard
Industrial Consultant

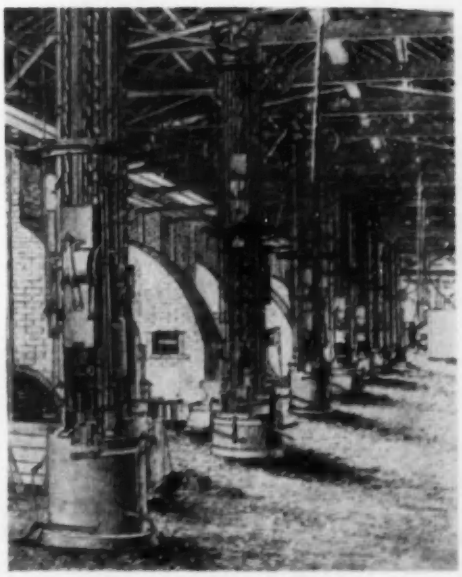




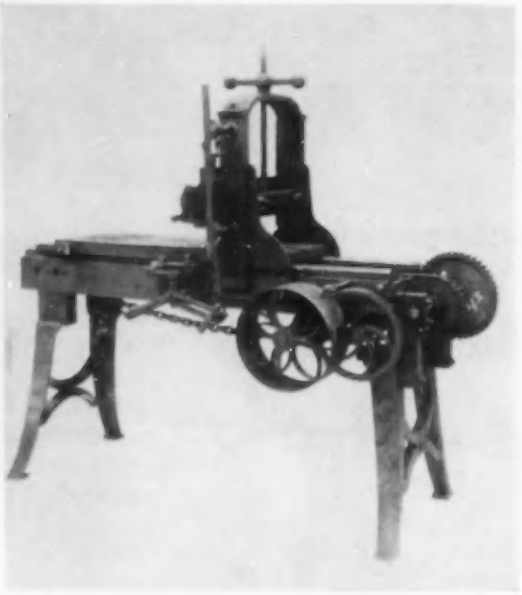
Above—Ezra Gould's improved version of Nasmyth's "steel arm." This was the direct ancestor of the modern Gould & Eberhardt shapers. It was designed and built in 1853. Above, right—An example of the "stone age" in American machine tool building. This big chain-driven planer, which operated in the famous Silver & Gay Shop, North Cholmsford, Mass., for nearly 100 years, had a granite bed shod with cast iron rails. In this respect it foreshadowed many giant machine tools of 1955 which embody elaborate foundation structures of reinforced concrete.

resentatives of Robbins & Lawrence Co., Colt Armory and B. C. Ames Mfg. Co., the live-wire New England companies who sponsored the exhibits.

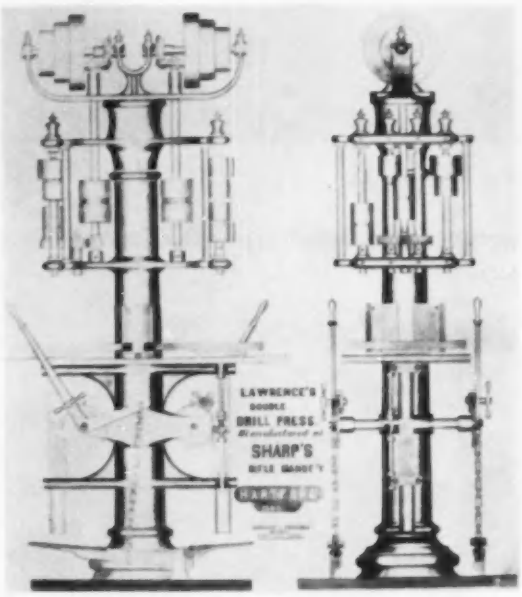
The Crimean War (1853-1856) was in the offing. England needed more and better firearms fast. The old Duke of Wellington, who to the very last held out for the "hand made" Brown Bess muskets, died on September 14, 1852. Thus it came to pass that in 1853 a Royal Small Arms Commission was quickly organized under the able chairmanship of mechanical engineer James Nasmyth, inventor of the steam hammer. In February of 1854, three top-ranking British commissioners were sent to the United States to study American production methods and



Battery of Elisha K. Roots drop hammers at Colt Armory in 1855. These drops had four heads lifted by ratchet bars for progressive operations.



Toolroom size planer built more than 100 years ago by an unknown Yankee genius who anticipated many features of modern planers. This machine is preserved in working order at the Henry Ford Museum.

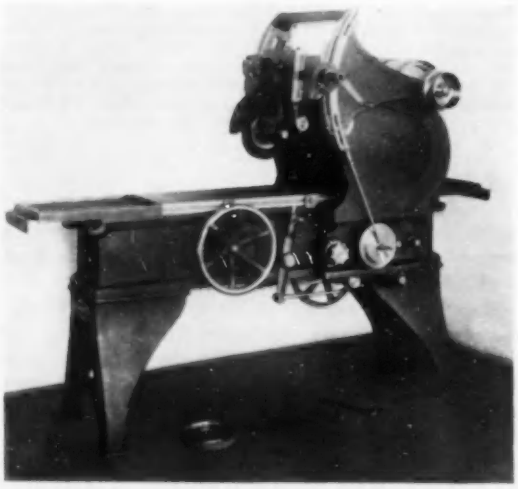


Double, multi-spindle drill press developed by Richard S. Lawrence at Sharp's Rifle plant, Hartford, Conn., 1855. Each side had four spindles. Work was fed to drills by elevating tables worked by hand levers and foot treadles.

to engage in the task of purchasing equipment.

The end result was that when Major Alfred Mordecai, commissioner of the United States Army Ordnance Department, in turn visited the new Royal Small Arms Manufactory at Enfield, England, in March of 1856, he sent this report back to his superiors in Washington: "A considerable part of this machinery already is in operation. The names B. C. Ames of Springfield, Mass., and Robbins & Lawrence of Windsor, Vermont, are to be read on most of the machines at Enfield Armory. They are constructed in style highly creditable to the skill

Early example of "automation." This is one of the famous Hartford automatics which grew out of Christoper M. Spencer's application of actuating cams to a Pratt & Whitney turret lathe in 1873.

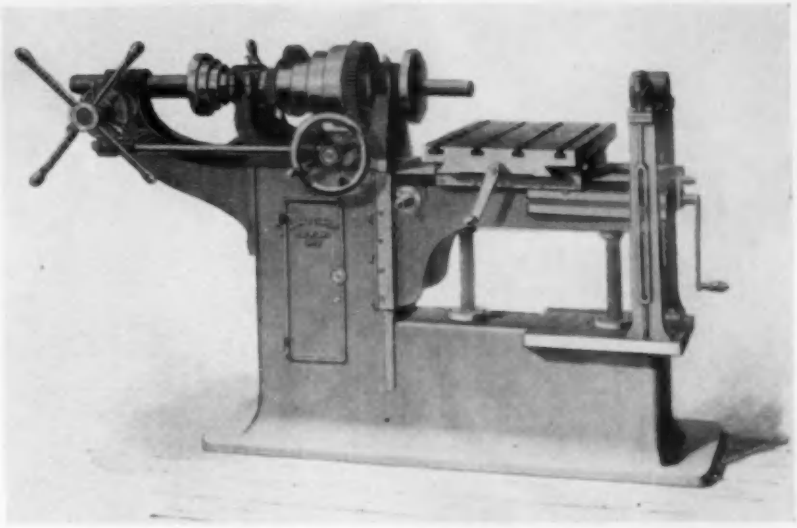


Brown & Sharpe surface grinder of 1876 vintage. This machine shows its planer ancestry, but at the same time it is of far more substantial and graceful design than most machines of that day and age.

of our workmen."

At long last the American system of manufacturing had won recognition abroad. At long last American machine tool builders gained a foothold in world markets.

Bear in mind that when all this was taking place, England had for considerably more than 50 years held world leadership in the design and construction of such basic machine tools as engine lathes, planers, shapers and boring machines. Most of the basic American counterparts appear to have stemmed from these English designs.



Horizontal boring, drilling and milling machine as developed by Warner & Swasey in the early 1880s. This was a forerunner of the Lucas horizontal boring mills of later date.

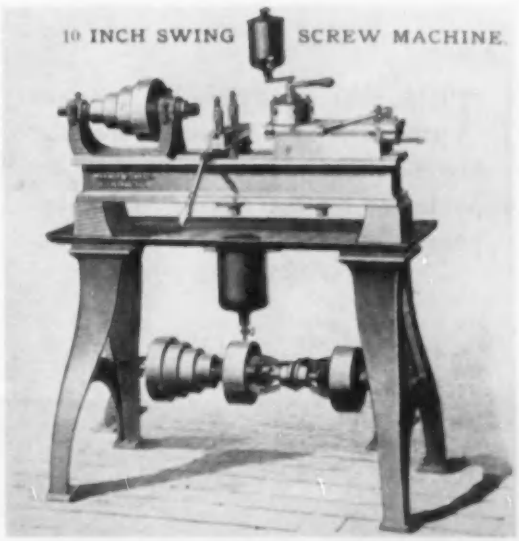
Here is how the English and the American machine tool builders came to a parting of the ways. English builders, who were inclined to cater primarily to the heavy industries, long continued to hold to the traditional idea that practically all machined parts had to be finished and fitted together by highly skilled craftsmen using files and scrapers.

American machine tool builders, on the other hand, subscribed to the philosophy that no workman should be called upon to put finishing touches on machined parts. They believed that machines should be so designed and tooled as to produce parts of such high degrees of accuracy and finish that they could be assembled without further ado. Such parts would be interchangeable, thereby insuring quick, easy repair of mechanisms.

The first type of American machine tool to bear the definite stamp of Yankee originality was the manufacturing milling machine. At first, Eli Whitney and his contemporary "mass productionists" used hardened steel filing jigs for accurately surfacing gun lock parts. This proved to be a major bottleneck in arms production. So it was that in 1818 Whitney designed and built a unique bench milling machine with power feed to its work table.

This little machine, still to be seen in the Museum of Science and Industry in New York, touched off a remarkable "chain reaction" in American milling machine development. Here in brief is the story:

Whitney's machine of 1818 inspired a more complete power actuated plain miller at the Silver & Gay shop, North Chelmsford, Mass. This came into being some time between 1820 and 1830 when there was migration of Whitney craftsmen to this North Chelmsford shop.

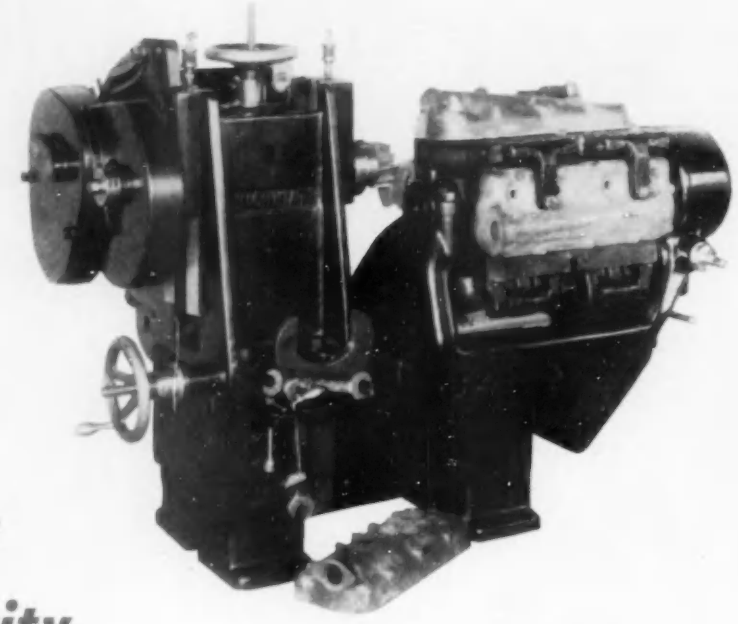


Warner & Swasey turret lathe of 1882 vintage, with self-indexing turret and provision for front and rear tools on cross slide.

Next in this chain came a still more complete plain milling machine and also an indexing milling machine, developed in 1850 by Frederick W. Howe at

(*Turn to page* 281, *please*)

Back in 1914 it took 162 machines of this type built by Cincinnati Milling Machine Co. to produce 108 cylinder heads per hour.



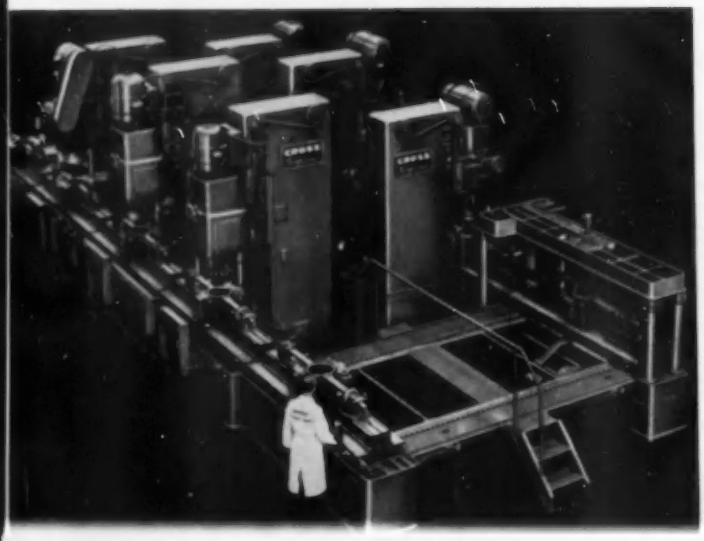
MODERN MACHINES *show* *Big Increase in Productivity* *in Relation to Investment*

By Thomas Mac New

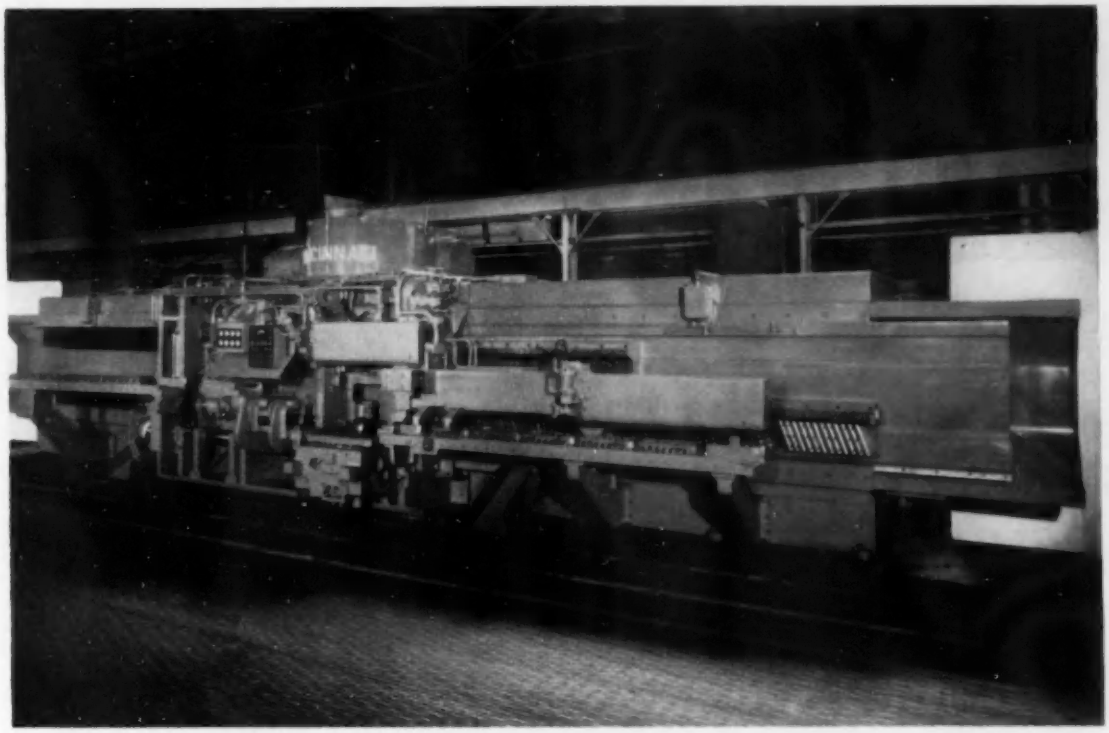
THIS special article on machine productivity is in lieu of "News of the Machinery Industries"—a department by the author which appears regularly in AUTOMOTIVE INDUSTRIES

IN some quarters for a number of years emphasis has been placed on worker productivity in manufacturing. What has been overlooked is the startling increase in machine productivity. A comparison of today's machines with those of bygone years reveals some very interesting productivity and costs relationships.

We talk in terms of how machinery has been improved, how many pieces it produces over a given period of time, how the product quality has been improved, and the amount of direct labor required to operate the equipment. Industrial management, however, often wonders about the cost of these new complex machines. Actually, today's machines are an inexpensive investment in comparison with the cost of machinery in the early part of this century to produce the same amount of a given product over a specific period of time. Everyone wants a maximum output with a minimum of cost, and today's machinery provides a very high



Cross Transfer-matic which replaced seven machines of 1935-37 vintage. It shared the same output characteristics with a much lower initial cost.



This modern machine tool is capable of turning out 150 cylinder heads per hour. Built by Cincinnati Milling Machine Co., it will be used for one of the new V-8 passenger car lines.

ratio of productivity compared to such cost of equipment.

Let us take, as an example, some information provided by Cincinnati Milling Machine Co. Back in 1914, that corporation sold 162 machines to an automobile engine manufacturer for machining four flat surfaces on cylinder heads at a rate of 108 cylinder heads per hour. These machines had an original investment cost of $243,000. Converting to current dollars, they would cost today about $651,240. Now, just one machine delivered in 1954 at a cost of $230,000 is utilized to produce the same number of cylinder heads per hour. Not only is the original investment lower, but the cost of direct labor per cylinder head has been reduced to 10 per cent of the 1914 figure of 40 cents.

Back in 1949, six machines were required to produce the 108 cylinder heads in one hour. Those units, of transfer type, sold for $240,000 in '49, or $271,200 based on the current purchasing power of the dollar. The 1949 machines cut 50 per cent off of the 1914 direct labor cost.

Technological advances have taken great strides even since the 1954 machine was delivered. Now, Cincinnati is delivering to a large automobile manufacturer a machine capable of producing 150 cylinder heads per hour. To compete with the 1954 machine, the new unit would have to operate at only 73 per cent of capacity, and, 222 units of 1914 vintage would be needed to duplicate the manufacturing operations of the new piece of equipment.

Another interesting example has been given by The Cross Co. Between 1935 and 1937, it supplied seven single-station

(*Turn to page* 264, *please*)

108 Cylinder Heads Per Hour

Years	Machines	Cost	
		Original	Replacement
1914	162	$243,000	$651,240
1949	6	240,000	271,200
1954	1	230,000	230,000
1955	0.73	.....	.....

TABLE I—Information was supplied by the Cincinnati Milling Machine Co. and the Federal Reserve Bank of Phila. The replacement cost is based upon the current purchasing power of the dollar.

20 Truck Axle Housings Per Hour

Years	Machines	Cost	
		Original	Replacement
1935-37	7	$395,000	$754,450
1952	1	320,000	323,200

TABLE II—Data were given by The Cross Co., and the Federal Reserve Bank of Phila. Replacement cost is based upon the dollar's current purchasing power.

AUTOMATION NEWS REPORT

FEEDBACK

AUTOMATIC CONTROLS

PRODUCTION — VEHICLES — AIRCRAFT

By Paul Kennedy

SHOW TIME

September traditionally is Fair Month, and this year industry upholds tradition. The world's biggest display of machines and accessories welcomes the Nation's manufacturers in Chicago next month.

The wide range of exhibits do have an important common interest, otherwise visitors couldn't be attracted in the huge numbers expected. It's this—more efficient production.

Production executives can't afford not to check this 3-D catalog of American ingenuity which gives the visitor so much for so little, everything considered.

It will be interesting to see how ably exhibitors meet the needs of management visitors. Technical details may be the key interest of engineers and production executives, but company officers and some others of great influence, whom machine-tool people may not see often, will also be attending. To overwork a phrase, they want to know where the machines, components, automation devices, etc., fit into their "big picture." Catalog data are only part of the answer.

"MAKING INDUSTRIAL AMERICA STRONGER"

Automatic controls are recognized as the foundation of the next Industrial Revolution. Just as industry expanded many times when low cost power and means for accurate machining were invented, so too will industry grow again as it breaks loose from human control. Progress in going beyond human limitations is well along in process industries and is making progress in the fabricating industries.

Public information about the benefits of automatic industry is spotty and inadequate. This goes back to a dearth of published data on the real potential for automatic controls, computers, handling devices, control components, etc. The public needs to become aware of its own demands for more output per man-hour, as well as of the means available to meet the demands. Opportunities were never greater for the machinery industry to promote an understanding of its future.

STAGES OF AUTOMATION

Transfer machines progress through various phases of development. In addition to the state of the art at the time, the phase of a particular machine depends on the volume of the workpiece, cycle time, complexity of operations, and investment required. Here are a few types of transfer machines, and nomenclature being adopted by some makers.

A "segmented" transfer machine is an in-line machine made up of standard machining heads mounted on individual bases. In addition, each segment or group of bases and heads is designed as a unit. Controls for the unit are complete in themselves. A "partially segmented" machine may have a single transfer bar in tying the segments together. A "fully segmented" machine would then have separate transfer means for each segment, with a connecting link between segements.

"Sectionalized" automation seems to imply groups of segments which can be individually loaded from stockpiles along the line. This could apply to either type of segmented machine.

Each of these concepts adds flexibility to the line in operation. Easier maintenance is said to be provided by separate control panels instead of a master panel. In some cases, delivery time is improved because the builder can design and construct certain segments while the workpiece design is still unfrozen.

Concepts such as these will be discussed at the Chicago shows, with the advantages made clear.

Standard business machine punches holes in the cards which later are placed into director of General Electric's Positioning Control.

NUMERICAL CONTROL 1

The control unit of a numerically-controlled jig borer will be demonstrated by Pratt & Whitney at the Machine Tool Show. Although the complete setup will not be ready in time for the show, the accuracy of the device will be clearly brought out by the exhibit. The control positions the table and carriage automatically, with accuracy reported as 0.0001 in. Locating instructions can be stored on punched cards or tape.

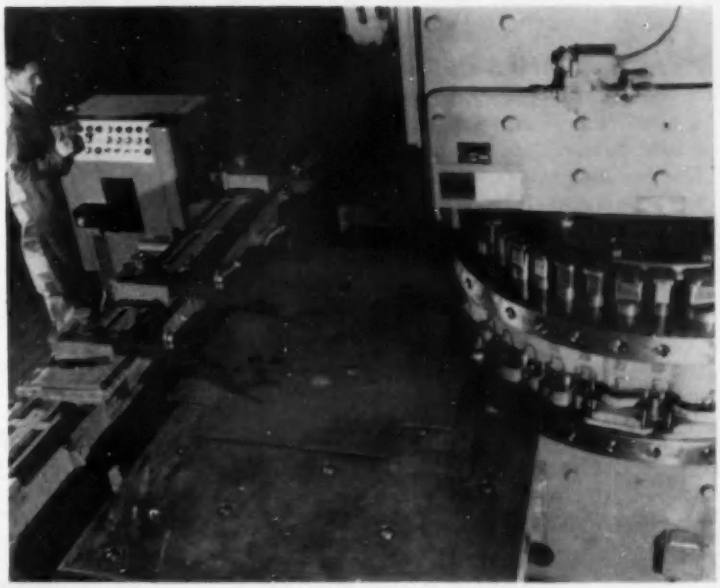
NUMERICAL CONTROL 2

In contrast to the machine tool control using tape as the storage device, announced in the July Automation News Report, a system using punched cards was announced recently. First used to position and operate a rotary turret punch press, Numerical Positioning Control can be adapted to riveting, placement, milling, boring and drilling machines, punch presses, lathes and shears. Productivity can be doubled or tripled, according to the Specialty Control Dept. of General Electric Co., Waynesboro, Va. Note illustrations.

No special code is required. On the turret press, actual part numbers, coordinates of the table to 0.01 or 0.001 in., turret position, and operator and machine instructions (one digit each) are punched decimally on standard business machine cards. Other directions which could be programmed include tool selection and indexing, sequencing, and cycling of transfer equipment.

The punched card is put into the reader-director in which pins read the positioning directions. These are converted into positioning signals. Each digit in a position column is represented by a command selsyn.

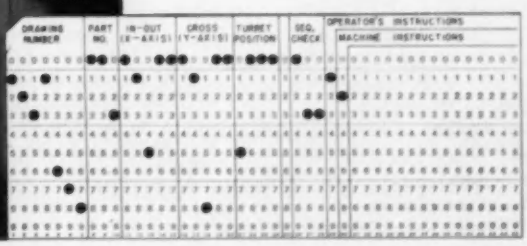
(*Turn to page* 268, *please*)



After work is loaded, operator starts 80-ton rotary punch press capable of punching six-in. hole in ¼-in. manganese steel.

Operator loads the director. A separate business machine card is used for each hole to be punched in the workpiece.

PUNCHED CARD SYSTEM OF CONTROL



Standard card punched for part number 003 on drawing 1231678. Card calls for x-axis at 15.000 in., Y-axis at 18.00 in., and turret at position 5000. This is operation 33 on this part. Operator's instructions 1 may call for removing workpiece after the operation; machine instruction 2 may be position and center punch.

METALS

Steel Order Backlogs Increase as Deliveries Fail to Meet Schedules. British Steel Prices Expected to Rise.

By William F. Boericke

Steel Deliveries Behind Schedule

Steel consumers who expected better deliveries and an easier situation in the third quarter have been bitterly disappointed. The mills are even worse off than they were before the strike. Demand continues to exceed capacity for most producers. Order backlogs are increasing and delivery promises are alarmingly behind schedule. A carry-over into the fourth quarter is certain. Some mills are accepting orders on sheets and plates for November and December. October is filled up.

Yet the operating rate in mid-August was no more than 94 per cent for the industry as a whole, although some mills, notably, Jones & Laughlin, were operating 100 per cent. Several factors were cited for inability to reach the pre-strike production level. The extraordinarily high summer temperatures have cut worker efficiency. Steel men, armed with fat pay checks, are less willing to work overtime instead of taking a vacation. And not unlike the human element, steel equipment needs a rest and repairs. Blast furnaces, open hearths, rolling mills, all need going over. The terrific production pace has taken its toll. In most cases maintenance has been neglected. Now the price has to be paid, and production suffers while equipment is repaired. This is particularly true for older, standby equipment that was pressed into service before the strike.

Scrap Scarcity Acute

Another factor is the scrap scarcity. The market has been advancing so rapidly as to cause alarm in the industry and in Washington. Prices are up to a near record. There's agitation to restrict exports to relieve the tense domestic situation, and corresponding pressure to let the market adjust itself without Government interference. Present Federal curbs on exports of iron and steel scrap continue into the third quarter. But no matter how it is decided, the steel producers find themselves in the middle.

Consumers' protest against steel price increases are virtually nonexistent. Some steel man assert privately that prices were not advanced enough. They would actually welcome some cancellations to permit themselves to catch up on delivery promises. Instead of cancellations, a flood of new business from the railroad car builders has cut into the already short supply of plates, sheets and structurals in urgent demand from other customers. Bookings of structural steel in the first six months of the year were up 33 per cent over the same period of 1954, and are currently exceeding deliveries. Warehouse business is brisk although many customers' plants have been shut down for vacation. The Bethlehem chairman reported he saw no evidence of inventory accumulation by the company's customers. Bethlehem is discouraging speculative buying of steel. Demand for every product of the company is in excess of ability to produce, he asserted. Automobile producers will want as much steel from Bethlehem in the second half of the year as in the first six months, in his opinion.

British Steel Prices Likely To Rise

The booming British steel market won't do as well in the second half of the year. The Iron & Steel Board expects a drop of 500,000 tons from the 10 million tons output in the first half. The trouble is due to lack of shipping facilities, more than any other single factor. British steel is relatively cheap in the world market, but the London *Mining Journal* remarks editorially, "It is feared that the resistance of British steel to the forces of inflation cannot be much longer maintained." Or more bluntly, British steel prices will rise.

High Prices for Nickel Abroad

The nickel supply position is increasingly difficult on both sides of the Atlantic. The extra 500 tons diverted from the stockpile to industry in August has made little difference, and the Office of Defense Mobilization has indicated that industry had better not hope that this action created a precedent.

Abroad the price of unallocated nickel has soared into the stratosphere. As high as $2.10 per lb has been paid in Japan.

Shortage of nickel for manufacture of stainless steel has turned interest to a new alloy called Thermenol, which requires neither nickel nor chromium in its manufacture, but a combination of iron, aluminum, and molybdenum. The metal is already being produced in ingots and other forms but not yet rolled. The U. S. Navy is interested because of the new alloy's resistance to high temperatures and corrosion.

(*Turn to page* 270, *please*)

NATCO ENGINEERS

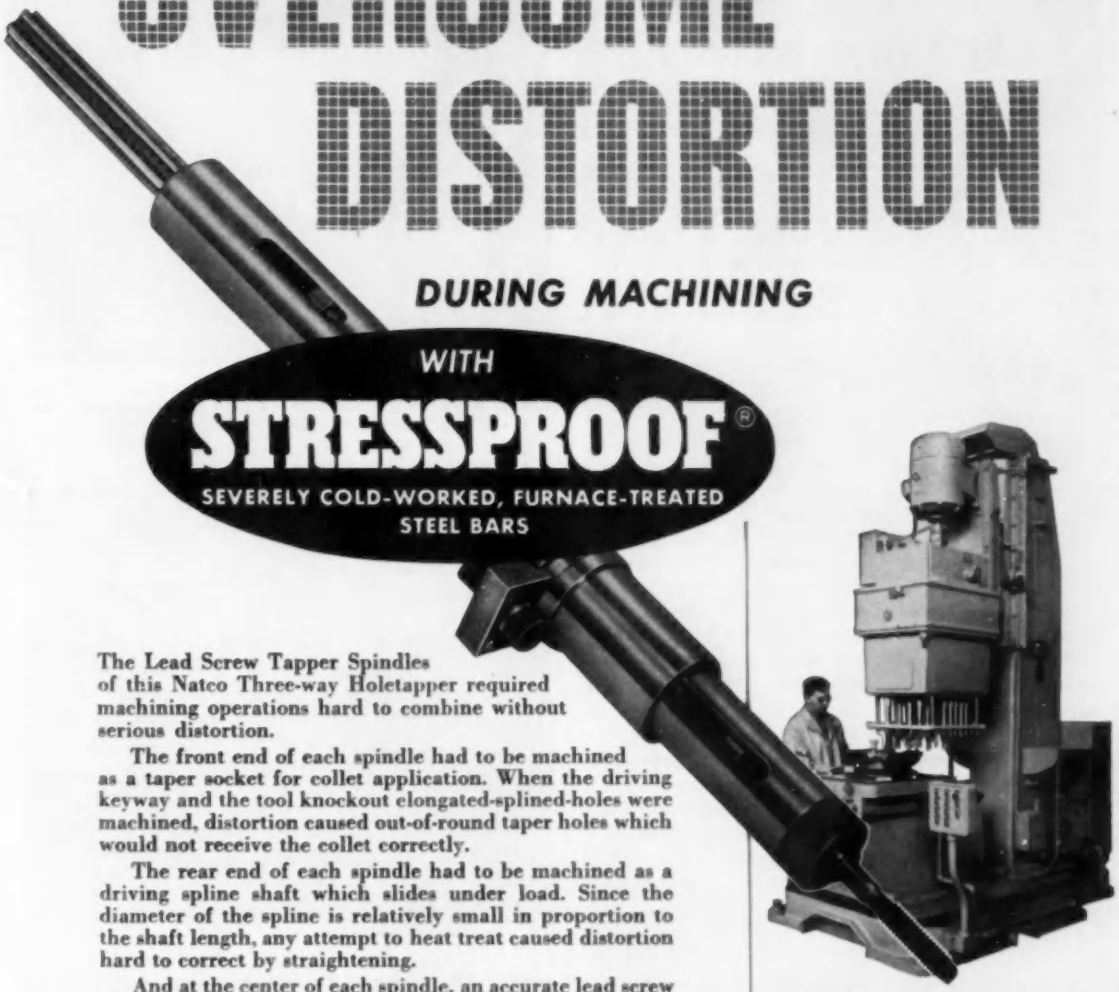
OVERCOME DISTORTION

DURING MACHINING

WITH

STRESSPROOF®

SEVERELY COLD-WORKED, FURNACE-TREATED STEEL BARS



The Lead Screw Tapper Spindles of this Natco Three-way Holetapper required machining operations hard to combine without serious distortion.

The front end of each spindle had to be machined as a taper socket for collet application. When the driving keyway and the tool knockout elongated-splined-holes were machined, distortion caused out-of-round taper holes which would not receive the collet correctly.

The rear end of each spindle had to be machined as a driving spline shaft which slides under load. Since the diameter of the spline is relatively small in proportion to the shaft length, any attempt to heat treat caused distortion hard to correct by straightening.

And at the center of each spindle, an accurate lead screw had to be machined by a thread grinding operation. It was found that the finish was much more easily obtained when STRESSPROOF was used.

STRESSPROOF eliminated both the problem of the out-of-round taper holes on the front of each spindle . . and the distortion of the driving-spline-shaft.

STRESSPROOF makes a better part at a lower cost.

National Automatic Tool Co. has for many years used STRESSPROOF in the manufacture of important operating parts for this Three-way Holetapper, as well as for other Natco high-speed machine tools.

WRITE TODAY FOR
Helpful Data Bulletin No. 15 "Improve Quality —Cut Costs"

AVAILABLE FROM LEADING STEEL DISTRIBUTORS COAST-TO-COAST

La Salle STEEL CO.

1438 150th Street, Hammond, Indiana

MANUFACTURERS OF AMERICA'S MOST COMPLETE LINE OF QUALITY COLD-FINISHED STEEL BARS

Looking for better parts at lower costs?

B-N BRAZED ASSEMBLIES MAY BE YOUR ANSWER

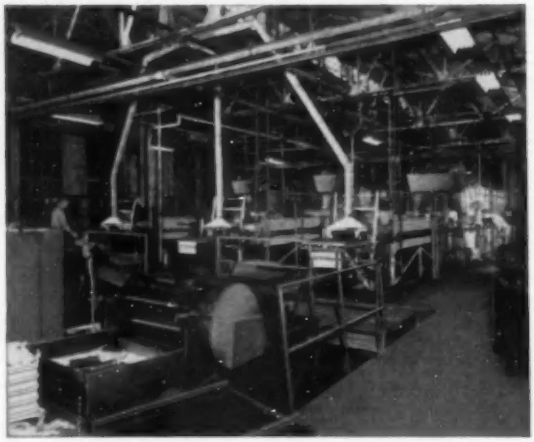
Burgess-Norton, one of the pioneers in production hydrogen-copper brazing, today serves industry with over $1,000,000 worth of diversified brazing equipment...utilized for an ever-widening range of components.

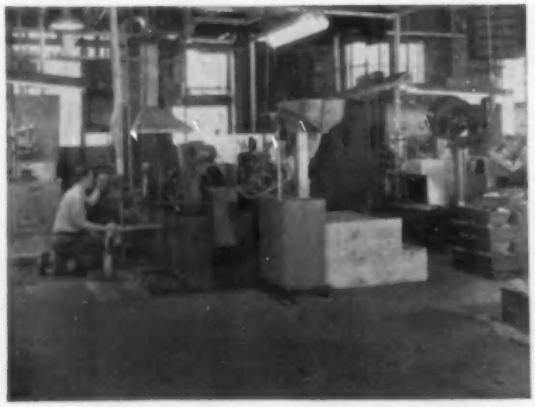
Over the past few years an increasing list of customers have found that redesigning their parts for production as brazed assemblies has made possible a new high in quality and performance, at reduced costs.

Quality is improved for many reasons...greater control of production and materials, closer tolerances, specialized steels in each part of the unit for specific requirements, more accurate heat treating results, greater uniformity throughout.

Costs are reduced, too, for varying reasons... sometimes because of the increased production possible by combining stampings and machined parts through brazing...or because material is saved because of the efficiency of brazed production...perhaps the savings are because the utilization of B-N facilities obviated installation of costly equipment, or because Burgess-Norton, one of the pioneers in production hydrogen-copper brazing, has gained valuable experience and knowledge that saves the customer through the total of many small efficiencies.

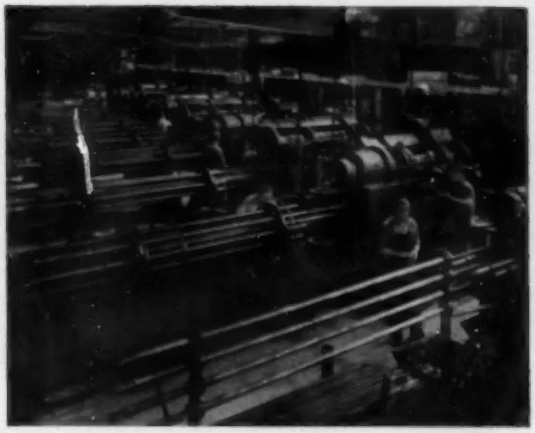
Brazed assemblies are not the answer to every parts problem, certainly, but they are being employed with advantage in more and more instances. If component parts are required in your production picture, we sincerely believe it will pay you to check with Burgess-Norton. Your inquiry will be handled promptly. If you prefer, a sales representative will call at your convenience.





The exceptional B-N heat treating facilities include both batch type and continuous fed atmosphere controlled furnaces, as well as induction heating. Burgess-Norton was one of the earliest firms to employ large scale induction heating for the treatment of metal.

Production of many of the brazed assemblies begins in the stamping department. By combining stampings and machined parts through hydrogen-copper brazing, B-N effects considerable savings in production and at the same time improves performance of the part.



This partial view of the Burgess-Norton screw machine department shows only a few of the basic machines employed in parts production. Facilities include machine tools for all secondary operations, plus a complete tool room.

These assemblies are representative of the many different parts problems that are being solved for industry by B-N engineering, production facilities and experience.

Firm in the knowledge that good parts begin long before actual production, Burgess-Norton maintains a large staff of engineers and an unusually complete metallurgical laboratory. These engineers, experienced in parts redesign for modern production methods, have been a major factor in the B-N "better parts at lower costs" story.

For a more complete picture of Burgess-Norton

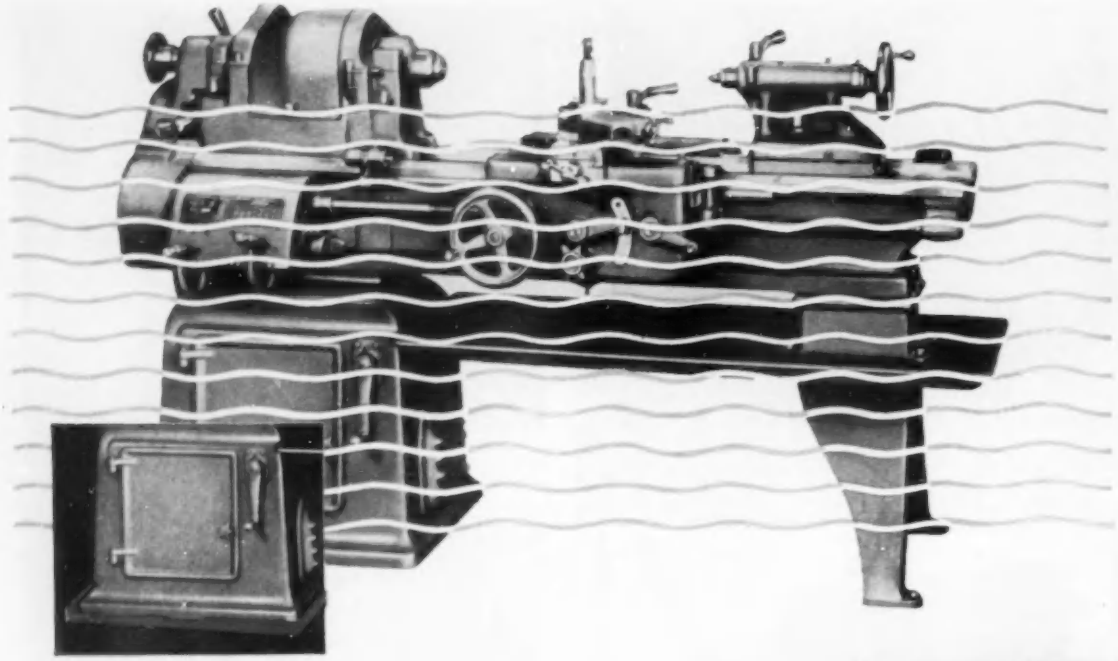
Send today for this FREE facilities brochure

BURGESS-NORTON MFG. CO.

ESTABLISHED 1903

GENEVA, ILLINOIS

SERVING INDUSTRY FOR OVER FIFTY YEARS



stop vibration...

cut maintenance costs with *Westsorb*

ADHESIVE-COATED FELT MOUNTS

Pre-applied to both sides. Peel off protective backings and Westsorb is ready for use. Sticks firmly to *any* dry surface — NO BOLTS needed. No down-time waiting for adhesive to set. Operate units immediately.

Dealer Inquiries Invited

Almost any machine in your plant will run smoother and quieter and with longer time between shut-downs if mounted on Vibration-absorbing Westsorb.

Westsorb will not break down under repeated impact loads . . . does not deteriorate . . . is resistant to oils, grease and acids. It is easily cut to size and installed — WITHOUT BOLTS — and can save many times its small cost by preventing future trouble.

Send for descriptive folder NOW!

WESTERN *Felt* WORKS

4021-4139 Ogden Ave • Chicago 23
Branch Offices in Principal Cities

Manufacturers and Cutters of Wool Felt

Hats off...

to LUSTERIZED*

TRADE-MARK

FINISH

Here's what they are saying about this NEW

COLD DRAWN FINISH

Today, It's Industry's most wanted BAR STEEL!

"LUSTERIZED FINISH needs no further surface preparation for our use."

"An outstanding development in the industry."

"We're no longer burnishing."

"We have eliminated a grinding operation."

"Your flats look plated."

"Our hats off to your research departments."

NON-LUSTERIZED

LUSTERIZED

Send in Your Order TODAY

* Trade-Mark Pat. Pend.

COLD FINISHED CARBON AND ALLOY STEEL BARS

BLISS & LAUGHLIN, INC.

GENERAL OFFICES: HARVEY, ILLINOIS

SALES OFFICES IN ALL PRINCIPAL CITIES

FOUR PLANTS:—

HARVEY, ILL.

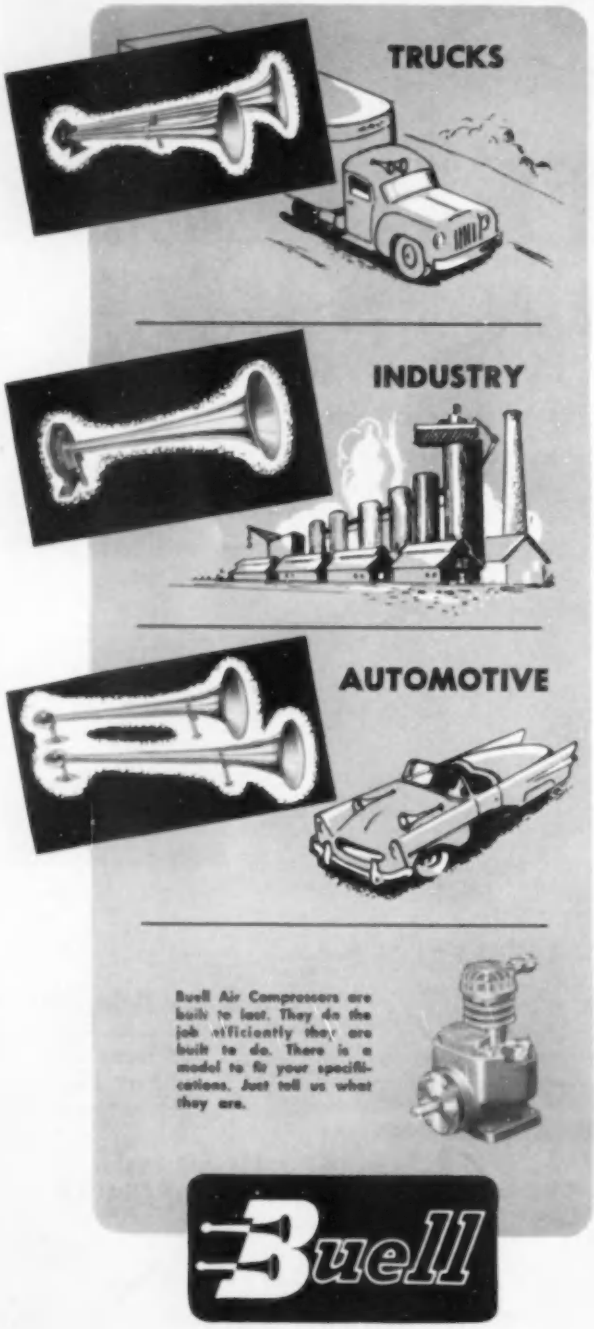
DETROIT, MICH.

BUFFALO, N. Y.

MANSFIELD, MASS.

For Every Car, Bus or Truck
and Every Industrial Use —

THERE IS A Buell AIR HORN!


TRUCKS
INDUSTRY
AUTOMOTIVE
Buell Air Compressors are built to last. They do the job efficiently that are built to do. There is a model to fit your specifications. Just tell us what they are.
Buell

The need for truly efficient warning signals was never more apparent than it is today. With more trucks and buses on the road, and traffic noise thus increased, Buell Air Horns are almost mandatory for safety. They can be heard over the roar of traffic for great distances, and many a trucker owes his life to this fact. Buell Air Horns are standard equipment on all Greyhound buses and have proved a great factor in Greyhound's well known and enviable safety record. Make them your standard too, and insure greater safety for your trucks or buses and the lives of those who drive or ride in them.

Industry, too, has found in Buell Air Horns the answer, where split-second warnings or signal calls are concerned. Their staccato blasts can be heard over operational din thru closed windows and doors, and above all other sounds. Factories, mills, construction companies, farms, ranches and, in fact, wherever there is need for quick response to a signal, they find that Buell Air Horns do the job best.

Today's cars are equipped with powerful motors, power brakes, power steering, safety glass and many other safety devices—but, so far, little attention has been paid by the manufacturers to the warning signal. Today's cars and those who drive them need a horn that can "whisper" in city traffic yet in emergencies, on the road, is capable of emitting a blast that can be heard over traffic noise for great distances. Such a device is the Buell Air Horn. Buells have been credited with preventing many accidents and saving many lives. It has been predicted that they will some day be standard equipment on cars—and they should be. What a telling point they'd be for the smart manufacturer who had the foresight to be the leader!

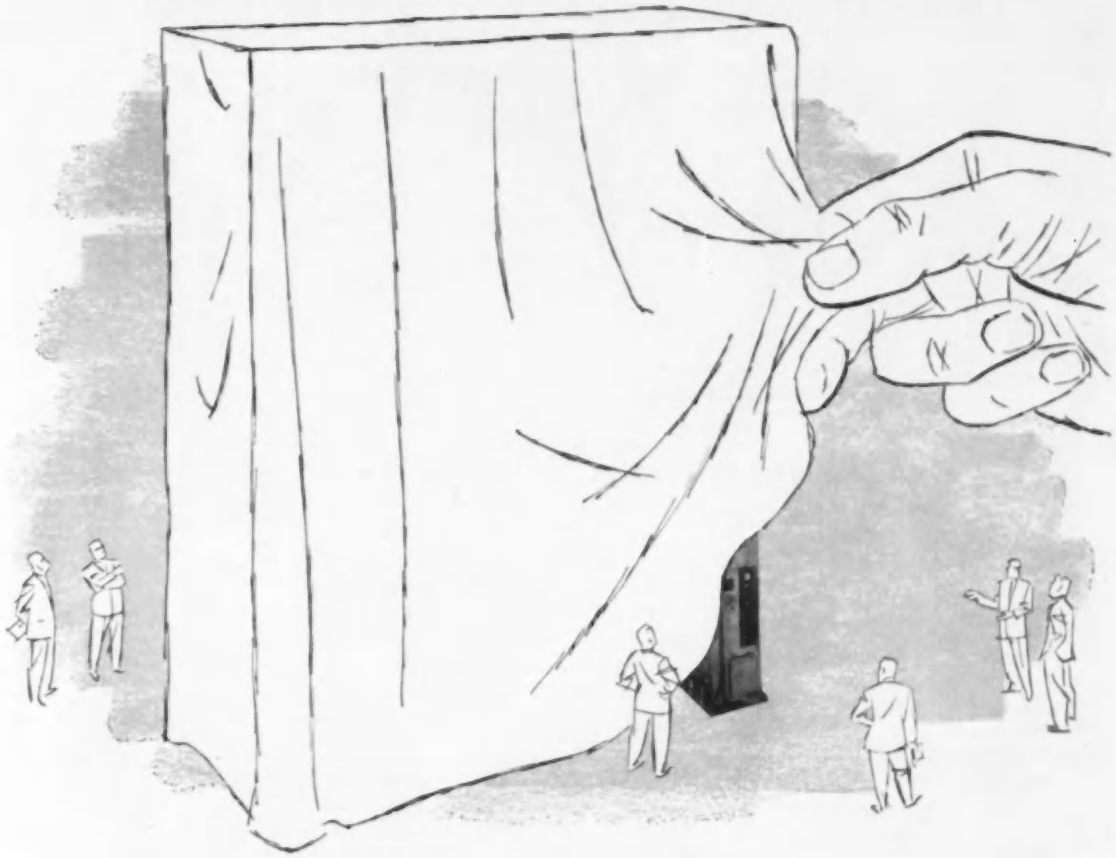
BUELL MANUFACTURING COMPANY
919 W. 49th PLACE • CHICAGO 9, ILLINOIS
Detroit Office
8-255 GENERAL MOTORS BUILDING — DETROIT 2, MICH.
Telephone TRINITY 1-1744

YOU ARE CORDIALLY INVITED TO THE

Verson

OPEN HOUSE

September 6 to 17



and the Unveiling of the Largest Double-Action Mechanical Press in the World

While in Chicago, during the Machine Tool Show, be sure to visit the Verson plant. Verson presses will be in operation for your examination in our new Research, Development and Exhibit Center.

Unveiling and presentation of the new Verson double-action mechanical press, the largest in the world, will take place during the Open House. It's the one event that you don't want to miss while in Chicago.

Write today. Plan your trip to the Verson Open House now. We will be pleased to arrange transportation for you between the Show, or your hotel, and the Verson plant.

A Verson Press for every job from 60 tons up.

Verson

ORIGINATORS AND PIONEERS OF ALLSTEEL STAMPING PRESS CONSTRUCTION

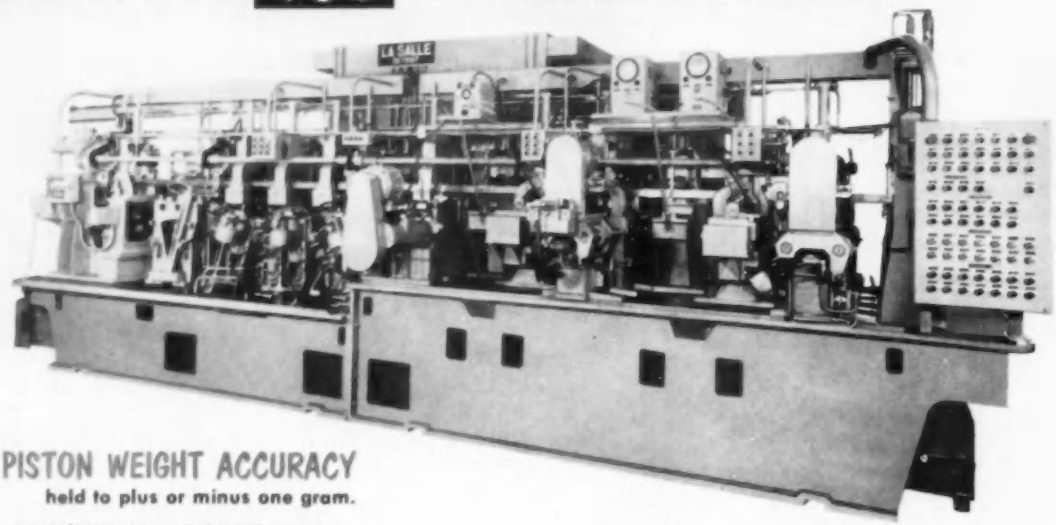
VERSON ALLSTEEL PRESS CO.

9307 S. KENWOOD AVENUE, CHICAGO 19, ILLINOIS • SO. LAMAR AT LEDBETTER DRIVE, DALLAS, TEXAS

MECHANICAL AND HYDRAULIC PRESSES AND PRESS BRAKES • TRANSMAT PRESSES • TOOLING • DIE CUSHIONS • VERSON-WHEELON HYDRAULIC PRESSES

La Salle AUTOMATED PISTON LINE

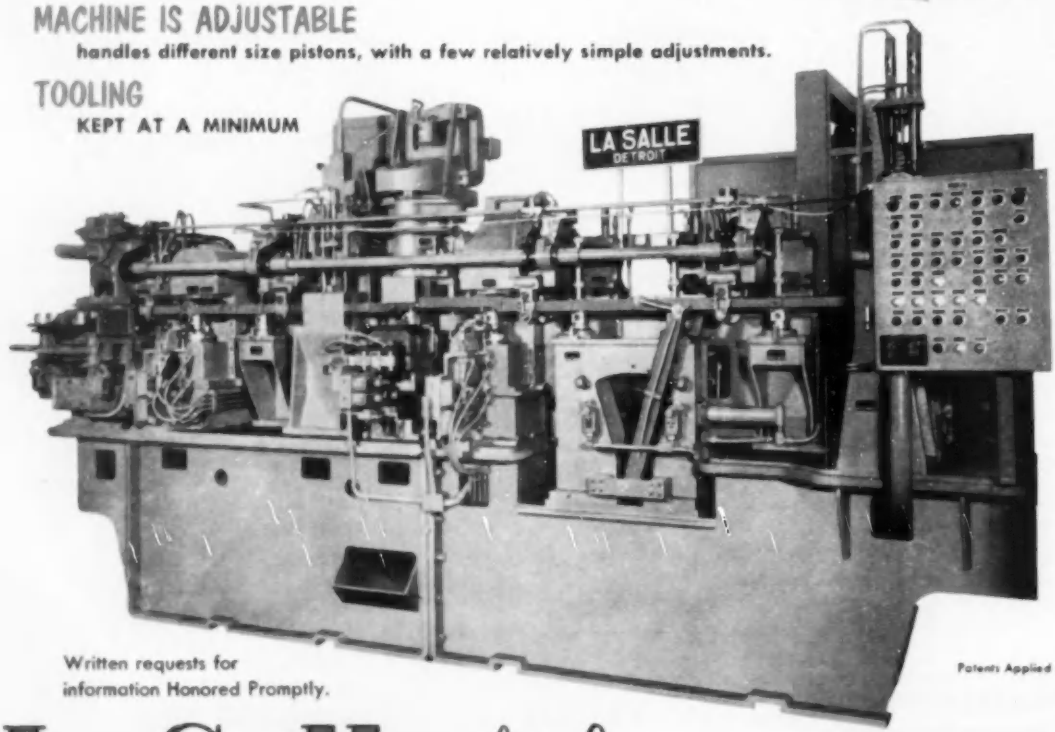
PRODUCES 400 PISTONS PER HOUR



PISTON WEIGHT ACCURACY
held to plus or minus one gram.

MACHINE IS ADJUSTABLE
handles different size pistons, with a few relatively simple adjustments.

TOOLING
KEPT AT A MINIMUM



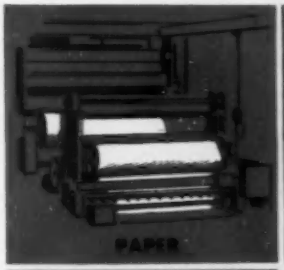
Written requests for information Honored Promptly.

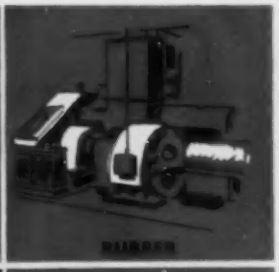
Patents Applied for.

La Salle tool, inc.

ENGINEERING & BUILDING SPECIAL MACHINERY

3840 EAST OUTER DRIVE • DETROIT 34, MICHIGAN





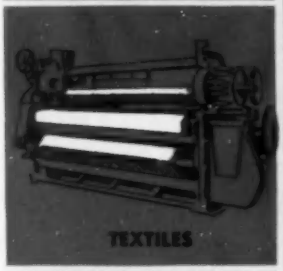
DYNAMATIC®

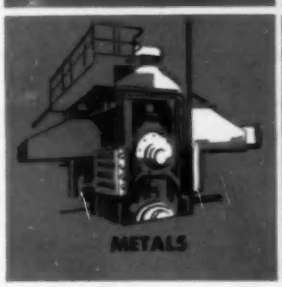
ADJUSTABLE SPEED EDDY-CURRENT DRIVES, COUPLINGS, BRAKES, DYNAMOMETERS

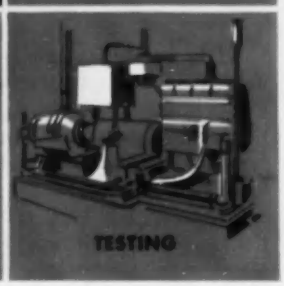
The Modern Method of Adjustable Speed Control and Testing for a Wide Range of Industries

Dynamatic Eddy-Current Couplings, Brakes, Dynamometers, and Ajusto-Spede® Drives are in use today in practically every industry—both in plant equipment and end products. They offer the advantage of rapid response, wide speed range, quiet operation, low power loss, low maintenance cost, and infinitely adjustable speed control from an AC power source.

Send for our new Bulletin GB2, describing and illustrating the basic Dynamatic Eddy-Current units.







EATON

DYNAMATIC DIVISION
MANUFACTURING COMPANY
3307 FOURTEENTH AVENUE • KENOSHA, WISCONSIN

PRODUCTS: Sodium Cooled, Poppet, and Free Valves • Tappets • Hydraulic Valve Lifters • Valve Seat Inserts • Jet Engine Parts • Rotor Pumps • Motor Truck Axles • Permanent Mold Gray Iron Castings • Heater-Defroster Units • Snap Rings Springtites® Spring Washers® Cold Drawn Steel® Stampings® Leaf and Coil Springs® Dynamatic Drives, Brakes, Dynamometers

they had to be certain...

So INTERNATIONAL HARVESTER chose RICHARDSON to mold this plastic distributor cap

When a manufacturer like International Harvester uses a part for all the tractors, power units, and implements it produces—the figure runs into hundreds of thousands a year. And because each part has to conform to rigid I-H engineering specifications—it has to be *right*, too!

Obviously, I-H must turn to a plastics molder who has facilities for large-scale production and who can offer precision molding skill and the assurance of uniform quality combined with delivery as scheduled.

And that's why Richardson was selected to mold this plastic distributor cap.

For a quarter century, Richardson has been handling the "tough ones" for International Harvester. Why not turn to Richardson when you have a tough plastics job?

INSUROK®

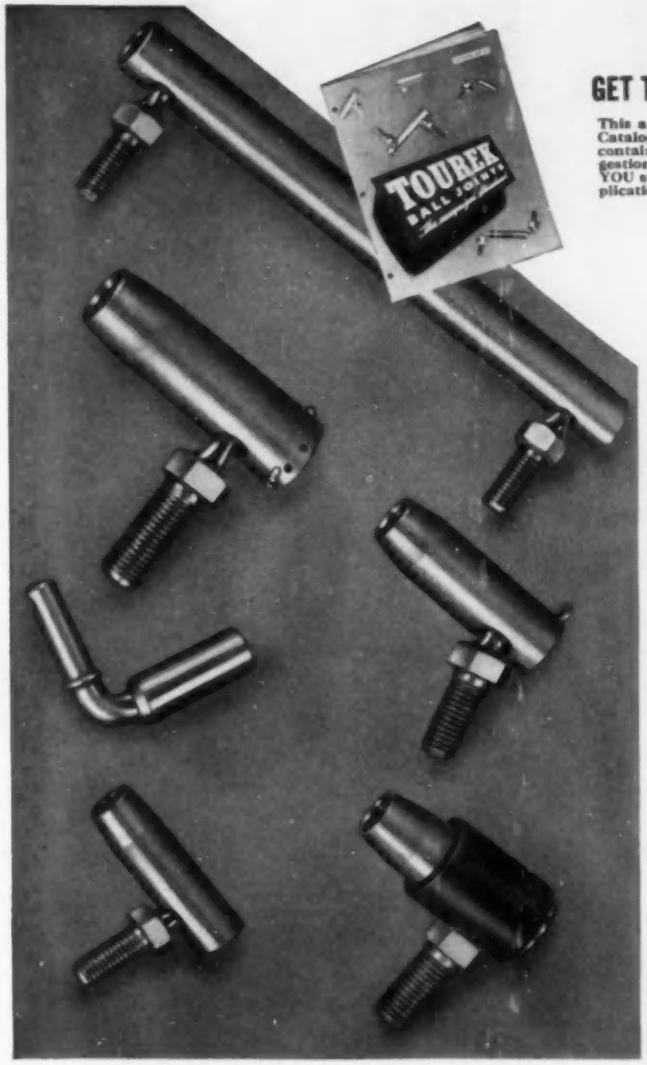
MOLDED & LAMINATED PLASTICS

The RICHARDSON COMPANY

FOUNDED 1858—LOCKLAND, OHIO

2678 Lake Street, Melrose Park, Illinois (Chicago District)

SALES OFFICES IN PRINCIPAL CITIES



GET THIS *Free* 16-PAGE BALL JOINT GUIDE!

This attractively printed 16-page TOUREK Ball Joint Guide-Catalog will be mailed to you without cost or obligation. It contains pictures, diagrams, cross sections, tables, ideas, suggestions and other technical data especially designed to help YOU specify exactly the right Ball Joints for your specific applications. Send for your copy today!

Tourek

EXTREME UNIFORM ACCURACY IN SCREW MACHINE PRODUCTS

standard ball joints

..recognized leaders *for* 31 years!

TOUREK "Standard" Ball Joints have long enjoyed an enviable reputation. They are widely known among critical buyers as *"the recognized standard"* by which others are judged.

31 years of specializing . . of developing and perfecting methods and machines are responsible for the UNIFORM accuracy of these better Ball Joints. Whether you need hundreds or thousands, you can depend upon TOUREK, with complete assurance, for a degree of precision which assures, for you, speedier production, lower costs, improved product performance!

If you need "standard" or special Ball Joints, or the fast, economical production of any type of SCREW MACHINE PRODUCT, you'll profit by turning to TOUREK for speedy service and cooperation. Extensive facilities and a large, experienced staff are ready, here, to give you ideas, suggestions and cost estimates. Will you tell us, now, just how we can best serve you?

J. J. TOUREK MFG. CO.

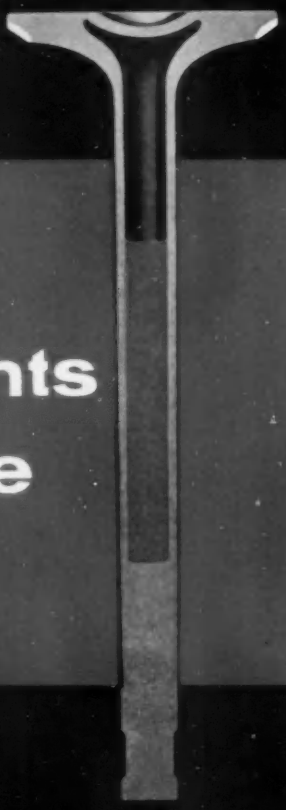
ESTABLISHED 1920

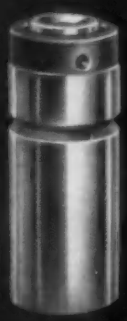
1901 SOUTH KILBOURN AVENUE, CHICAGO 23, ILLINOIS

. . UP TO 2-5/8" DIAMETER SINGLE AND MULTIPLE SPINDLE MACHINES . . THREADING • TAPPING • MILLING • DRILLING • GRINDING • POLISHING • PLATING • HEAT TREATING • SILVER SOLDERING •

WORLD'S LARGEST MANUFACTURER OF "STANDARD" BALL JOINTS

EATONITE VALVE SEAT INSERTS

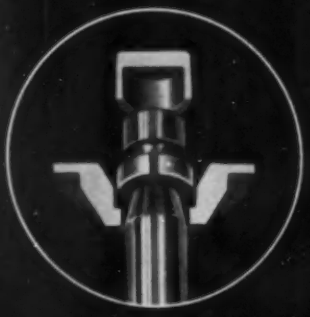




EATON *Zero-Lash* HYDRAULIC VALVE LIFTERS

5 Eaton Developments that Increase Valve Life

EATON SODIUM-COOLED VALVES



EATON FREE-VALVES

EATONITE-FACED VALVES

EATON MANUFACTURING COMPANY

—VALVE AND SAGINAW DIVISIONS—

9771 FRENCH ROAD • DETROIT 13, MICHIGAN

PRODUCTS: Sodium Cooled, Poppet, and Free Valves • Tappets • Hydraulic Valve Lifters • Valve Seat Inserts • Jet Engine Parts • Rotor Pumps • Motor Truck Axles • Permanent Mold Gray Iron Castings • Heater-Defroster Units • Snap Rings • Springtites • Spring Washers • Cold Drawn Steel • Stampings • Leaf and Coil Springs • Dynamatic Drives, Brakes, Dynamometers

See Danly's New Die Spring Line...

3 COMPLETE PRESSURE RANGES TO CHOOSE FROM!

Now, you can design longer spring life into your dies. The new Danly Die Spring Line offers you 236 different springs to choose from—with the range of characteristics you've been looking for. Design of all springs in this new line is based on fatigue testing through millions of compressions at recommended loading and deflection.

Select the die springs you need from the new Danly line and get exactly the deflection, spring rate and size you want.

Shown above is a spread from the new Danly Die Spring Catalog—detailing the simplified spring selection procedure worked out for you.

Send For New Catalog...

The new Danly Die Spring Catalog makes selection of the right die spring easier than ever before. Contains complete pressure and deflection data, as well as dimensions. Here are some of the unusual features of this catalog:

- **New Method of Selection** . . . new "step-by-step" selection method simplifies choosing the proper die springs to meet any given problem.
- **Simplified Charts** . . . the regular spring tables are read "straight across" and contain complete details to minimize confusing cross references.

Send for your FREE copy today.

DANLY

DIE SETS . . .
STANDARD OR SPECIAL
DIEMAKERS SUPPLIES

DANLY MACHINE SPECIALTIES, INC.
2100 South Laramie Avenue • Chicago 50, Illinois

THE TREND TO

JAMESTOWN, N. Y.

SITUATION: Growing sales were taxing production capacity of tool mfr's. forge shop. Had four belt-driven board drop hammers.

SOLUTION: Four Ceco-Drops now in operation —have been giving excellent service. Production is up—maintenance is down. "3 hours charged against Ceco-Drops in 42 days". —"One Ceco-Drop ran 108 hrs. (21 days) without maintenance or die work."

FLINT, MICH.

SITUATION: Large Auto Co. with 16 Board Drop Hammers—(7 of them Chambersburg "J's")—ranging in age from 7 to 30 years. Lowered production rates and mounting maintenance costs.

SOLUTION: Started modernization in 1953. Converted* four "J's" with Ceco-Drop upper works. Cost and down time reduced —production up—operators like them. Other "J's" to be converted*. Ceco-Drops will replace older board hammers.

*Saves cost of anvil and foundation!

COLUMBUS, O.

SITUATION: Job shop with 5 Board Drop Hammers finds equipment obsolete—cannot compete with lower prices and higher production of other more modern shops.

SOLUTION: Initiated 10 year program of modernization to include 15 Ceco-Drops. Three Ceco-Drops already installed to replace board drop hammers.

CHICOPEE, MASS.

SITUATION: The managers of one of the East's largest forge shops saw Ceco-Drops in operation in another plant. Decided on this type of hammer for their shop.

SOLUTION: Promptly ordered a 2,000 lb. Ceco-Drop and a 2,500 lb. Ceco-Drop. After a year's service their record was so good that two more 2,000 lb. Ceco-Drops were ordered. These latter are now in operation.

ALLENTOWN, PA.

SITUATION: Tool works had the problem of keeping 23 "old dog" board drop hammers operating profitably. Had but one recent model "J" Chambersburg Board Drop.

SOLUTION: Management launched a modernization program calling for nine Ceco-Drops capable of producing a yearly tonnage in excess of the 23 old board drop hammers. Four of the Ceco-Drops are now in operation, shop layout has been revised. Efficiency and production methods have been improved.

CHAMBERSBURG

CHAMBERSBURG

CECO-DROPS . . .

SKOKIE, ILL.

SITUATION: One of largest manufacturers of hand tools is planning a new shop. Decided to have modern Gravity Drop Hammers.

SOLUTION: Selected Ceco-Drops, and on a programmed basis is replacing board drop hammers with Ceco-Drops. To date, two 2,000 lb. Ceco-Drops and one 2,500 lb. Ceco-Drop are in operation—"Doing fine".

. . . and remember the Lansing Story?

LANSING, MICH.

Lansing, Mich. is unique among industrial cities in the concentration of drop forging activity in its many factories. It may well claim the title of "Drop Forging Capital of the World". In Lansing are six great forging shops covering 14 acres of land, with a working area of 985,579 sq. ft. All these great forging shops are using Chambersburg Ceco-Drops.

Forge Shop No. 1—installed the first Ceco-Drop in 1947—now forging connecting rods.

Forge Shop No. 2—has installed 5 Ceco-Drops since 1950—making automotive forgings.

Forge Shop No. 3—bought 4 Ceco-Drops since 1948—Commercial and automotive forgings.

Forge Shop No. 4—bought seven Ceco-Drops in the last six years.

Forge Shop No. 5—Purchased 3 Ceco-Drops in 2 years.

Forge Shop No. 6—One of largest in world. Installed 11 Ceco-Drops since 1951.

The gravity drop hammer with short stroke control

ENGINEERING CO.

PENNSYLVANIA

MOTOR CARS

Lubrication
Transmission
Power Steering
Brake Booster
Window Lifts
Top Lift
Rear Deck Lift
Hood Lift
Seat Adjustment
Ride Control
Wheel Jack

MOTOR TRUCKS

Lubrication
Transmission
Power Steering

TRACTORS

Lubrication
Transmission
Power Steering

BUSES

Lubrication
Transmission
Power Steering
Door Closers

AIRCRAFT

Lubrication

MARINE

Lubrication
Transmission

AIR CONDITIONING

Lubrication

?

AND IN YOUR PRODUCT

BUSINESS EQUIPMENT

Servo Operations

FARM MACHINERY

Lubrication
Power Steering
Implement Control

Eaton Pumps

Provide Silent Hydraulic Power for a Wide Range of Applications

Eaton Pumps provide hydraulic power or vacuum for an almost endless list of applications. Outstanding characteristics are compact design, silent operation, high mechanical and volumetric efficiency at all speeds, and competitive cost. Millions of Eaton Pumps are in use today in leading motor cars, trucks, tractors, aircraft, and appliances. Eaton engineers will welcome the opportunity to discuss the application of Eaton Pumps to your products.

MECHANICAL FURNITURE

Opening and Closing
Raising and Lowering

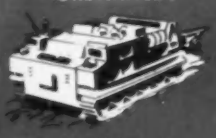
BUILDINGS

Door Openers
Window Control

HOME APPLIANCES

Servo Operations

ORDNANCE



Lubrication
Steering
Servo Operations

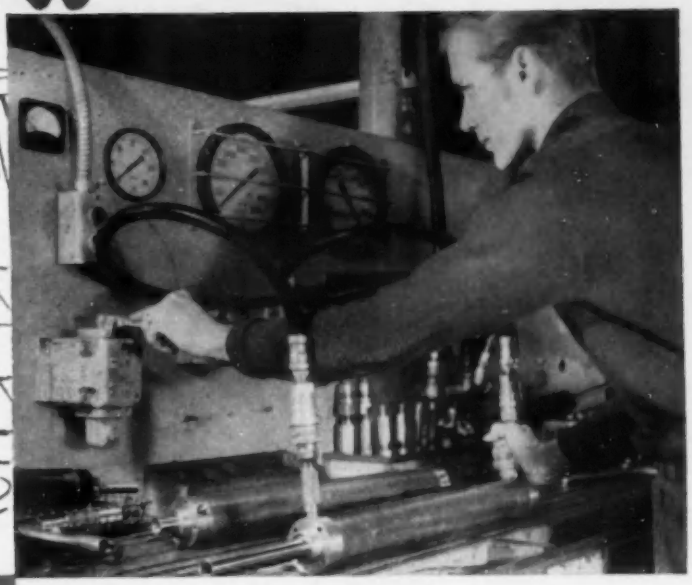
EATON

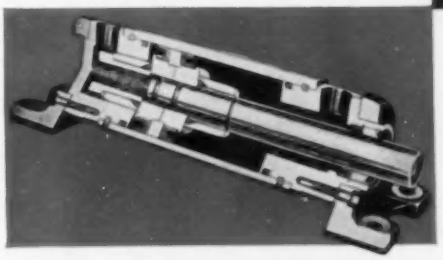
PUMP DIVISION
MANUFACTURING COMPANY
9771 FRENCH ROAD • DETROIT 13, MICHIGAN
General Offices: CLEVELAND, OHIO

PRODUCTS: Sodium Cooled, Poppet, and Free Valves • Tappets • Hydraulic Valve Lifters • Valve Seat Inserts • Jet Engine Parts • Rotor Pumps • Motor Truck Axles • Permanent Mold Gray Iron Castings • Heater-Defroster Units • Snap Rings Springtites • Spring Washers • Cold Drawn Steel • Stampings • Leaf and Coil Springs • Dynamatic Drives, Brakes, Dynamometers

PRE-TESTED!

to assure dependable performance





and O-M CYLINDERS

fit where others won't

O-M CYLINDERS (air • hydraulic)

Complete testing facilities at our modern new assembly plant take the guesswork out of cylinder performance. Before shipment every O-M Air and Hydraulic Cylinder is "power-tested" and approved, assuring dependable prolonged service under all normal operating conditions.

Standard, semi-standard, "special" air and hydraulic cylinders available in full range of sizes (1½" to 8" bores) with standard, 2 to 1 or oversize rods. Completely interchangeable parts. Immediate delivery on many sizes.

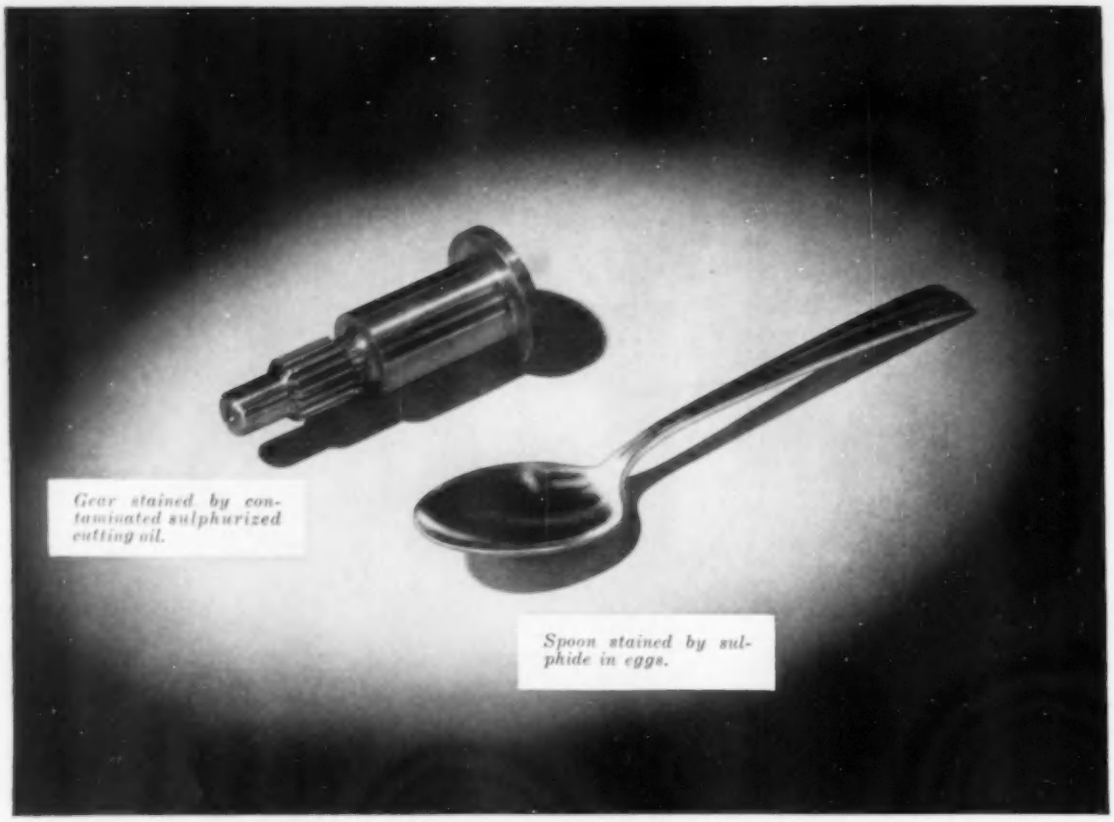
mail coupon now!

for FREE catalog, complete set of ½-scale templates, showing all cylinders, mounts and mounting brackets.

ORTMAN-MILLER MACHINE COMPANY
17 143rd Street, Hammond, Indiana

☐ Have representative call ☐ Send latest catalog ☐ Send ½-scale templates

Name _____ Position _____
Company _____
Address _____
City _____ Zone _____ State _____



Sulphur Staining on Ferrous Parts is Harmless

Staining of machined ferrous parts caused by cutting fluids containing active sulphur is similar to the stains you find on your silverware. It has no adverse effects whatsoever on the finish, or characteristics of the metal. *It is not corrosion*, and according to automotive and military authorities, in no way affects service life.

Experience has proved that cutting fluids containing active sulphur provide far better performance when machining the tougher steels. Staining can only occur during very humid conditions or when water is allowed to contaminate the sulphurized cutting oil. A sample piece of metal will not stain in a cutting fluid free of water . . . but often it will the moment moisture is added.

The *important* factors to consider when selecting a cutting fluid are surface finish, production and tool life. Here is where a cutting fluid pays for itself. Ask to have "the Man in the Barrel", your Stuart Representative, help select that Stuart Oil that will produce the very best results under the conditions you will subject it to.

Further information on sulphur staining is provided in the D. A. Stuart Shop Note Book, Bulletin S-1. Write for your copy.

D. A. STUART OIL COMPANY, LTD.
2733 S. Troy St., Chicago 23 Ill.

More than a "Coolant" is Needed

Stuart Oils

Time Tested Cutting Fluids and Lubricants

Plants in: Chicago, Detroit, Cleveland, Hartford, and Toronto, Ontario.

Branch Warehouses and Representatives in principal metal working centers in the United States, Canada and Europe.

AI

AUTOMOTIVE INDUSTRIES

MACHINE TOOL & PRODUCTION EQUIPMENT ISSUE—1955

THE MACHINE TOOL SHOW

CHICAGO, ILL.

SEPT. 6-17, 1955

INTERNATIONAL AMPHITHEATRE

YOU DON'T CUT ANY FASTER...

you just finish the job sooner

and at lower cost per piece

Most *good* modern machines will cut as fast as today's carbide and high-speed tools will take it, so your actual time per cut will be the same, regardless of the machine you use. But when you put jobs like this on an

Acme-Gridley Fully Automatic Turret Lathe

you *finish them faster* because non-cutting (idle) time is accelerated and controlled. The complete machining cycle is entirely automatic and predetermined—to give the minimum time per piece, on *every piece*. Machining is done at the surface speed best suited for required finish and tolerance because each toolslide is independently cammed and selective spindle speeds are automatically controlled.

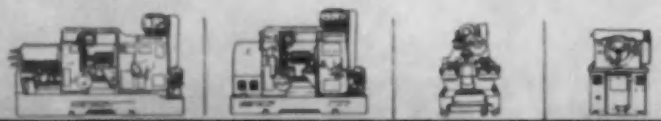
Ask us to show you how *automatically controlled cycle** can turn non-productive "idle" time into savings like this—on your jobs.

Automatically controlled cycle
IS **STANDARD** ON ALL ACME-GRIDLEYS.

Send for Catalogs M-50A and MC-53

JOB FACTS

- **PACKING GLAND NUT from 4¼" round 1112 C.D. Steel.**
- **12 OPERATIONS (with 9 tools) including threading and tapping.**
- **FORMER METHOD produced 409 pieces in 192 hours on hand operated machine.**
- **ON MODEL M ACME-GRIDLEY—325 pieces in 48 hours.**
- **SAVINGS—7 to 2 production increase at better than 3 to 1 savings in cost per piece.**



OUR JOB: to provide the *Right Machine* for YOUR JOB

Acme-Gridley 4, 6 and 8 Spindle Automatic Bar and Chucking Machines • Fully Automatic Turret Lathes (Bar and Chuck Type) • Hydraulic Thread Rolling Machines • Automatic Threading Tools • Switches • Solenoids • Contract Manufacturing.

THE NATIONAL ACME COMPANY

173 EAST 131st STREET • CLEVELAND 8, OHIO

NEW EQUIPMENT .... AT MACHINE TOOL SHOW

GISHOLT MACHINE CO.

Booth 1413

The entire line of turret lathes, automatic lathes, balancing and superfinishing machines will be shown.

Ram Type Turret Lathes:

The No. 3 Electram: This machine will feature the Gisholt-Weatherhead chuck, which power indexes the workpiece without stopping the spindle. The job shown will be machining all four ends of a small tee fitting in a single chucking of the part.

The No. 4 Ram: A wormwheel shaft will be machined from bronze bar stock. Features of this machine will be the hydraulically operated bar feed and collet chuck.

The No. 5 Ram: This machine will feature the Gisholt Jetracer mounted on the rear of the cross slide. This will be the first public showing of this new hydraulic pressure tracer unit. The job will be machining an arbor.

The Big Bore No. 5 Ram: This machine will be working with 4½ in. OD aluminum alloy bar stock. Unusual demonstration of small machine handling large work on non-ferrous material. Feature will be complete machining operations on a special ash tray.

Saddle Type Turret Lathes:

The 1L Saddle: Power meter will show real work necessary to quickly produce 12 in. aluminum air cylinder bodies. Cross-feeding turret and well planned tooling permit doing two operations with one set of tools.

The 2L Saddle: Fixed center hexagon turret, with 4½ in. capacity collet chuck and bar feed. Features Jetracer template unit, mounted on bridge type cross slide. Job machining bar feed wedge.

The 3L Saddle: Twenty-four speed machine on valve bodies. Machine equipped with fixed center hexagon turret and full length lead screw. Jetracer template unit will be operat-

(*Turn to page* 114, *please*)

SHEFFIELD CORP.

Booth 1305

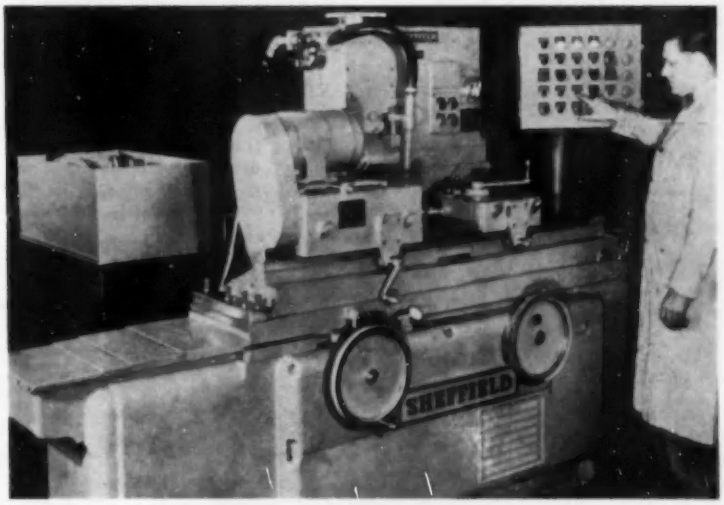
Machine tools, automatic gaging devices, machine controls, and contract services will be demonstrated and explained at this exhibit. Model 180 Multi-Form grinder is a new machine designed especially for the Crushtrue dressing process. It uses four-in. wide wheel and will grind work up to 10 in. in diameter and 24 in. long. It is available with built-in size controls for automatically bringing parts to finish size. Other features include variable speed control for automatic fast and slow feed of the wheel into the work, and an automatic plunge wheel device with one-in. rapid approach and retraction of the wheel to the work. In addition, the wheel has cam controlled feed of 0.250 in., with dwell time variable.

The model 101 thread and form grinder is for fast, accurate, low cost grinding of threads and forms. The wheel may be formed by Crushtrue grinding, by diamond dressed multiribbed wheel grinding, or by conventional single-point wheel grinding. The machine has a capacity of 12 in. between centers and will grind a maximum thread length of eight in. and a maximum thread diameter of three in. It uses a 13-in. diameter wheel up to 1¼ in. wide for threads. Two-in. wide wheels can be used for forms. It has a helix angle adjustment for up to 20 deg. either right hand or left hand. It may be equipped with lead varying mechanism.

New features on this machine include: automatic plunge wheel infeed device with manually initiated starting for fully automatic grinding cycle; plunge depth capacity 0.250 in. with dwell time variable. The automatic electrically powered Crushtrue dressing device has timer control of crushing cycle during wheel dressing.

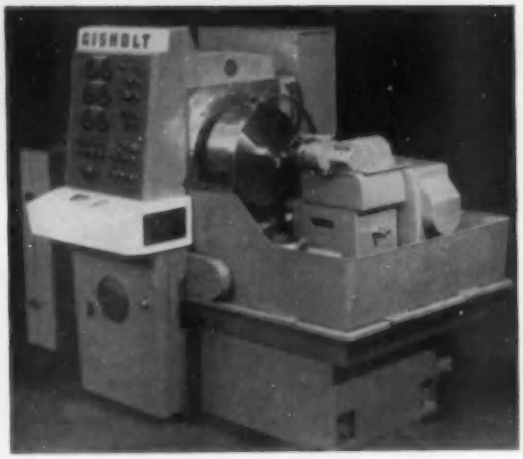
The model 134 thread and form grinder with manually initiated automatic cycle is a completely new machine designed for the production of precision ground threads and forms on small parts, instrument components, and taps. It is small and compact, requiring only 48 by 50 in. of floor space. It can grind threads up to ⅛

(*Turn to page* 115, *please*)

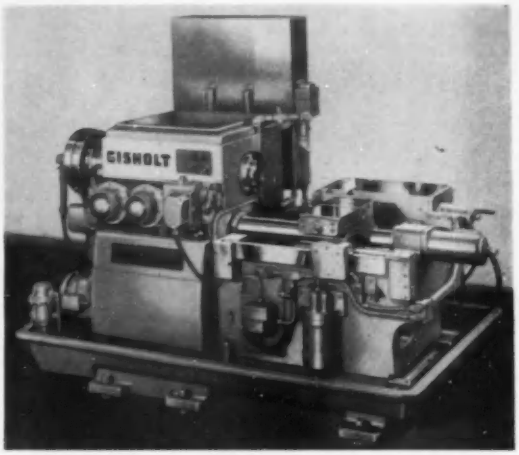


Sheffield model 180 Multi-Form grinder

Gisholt—*continued*



Gisholt Masterline No. 79 Superfinishing machine



Gisholt Masterline No. 12 automatic production lathe

ing from face of hexagon turret.

The 4L Saddle: Job on pulley. Features 24 in., 3-jaw scroll chuck with power chuck wrench. Also cross-feeding hexagon turret will be equipped with taper attachment for straight or contour work.

The 5L Saddle: 24 in., 3-jaw independent chuck body to be machined. 75 hp driving motor. Will feature remote speed selector and spindle controls, as well as compound cross slide with power angular feed.

Automatic Production Lathes:

The No. 12 Horizontal: Traverse worm shaft, using Jetracer and indexing tool. Machine takes four consecutive, automatic passes from four templates, each of different length and different pattern.

The No. 12 Vertical: Torus cover will be machined from three tool slides. This vertical machine takes less floor space and adapts to faster handling from either pallets or conveyors.

The No. 12 Automatic: Job on electric rotor. Machine includes automatic handling, automatic gaging, automatic tool-setting and other features required for completely automatic operation.

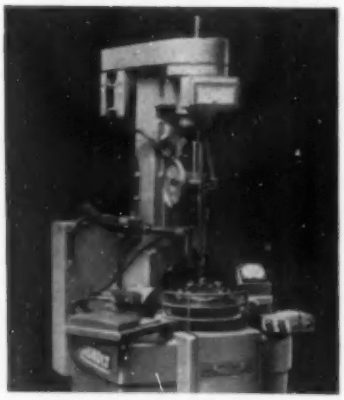
The No. 24 Automatic: Machining oil well tool joints. Complete push button operation for loading and unloading from conveyors and operating automatic machine cycle. Features integral chip disposal equipment.

The Simplimatic: Two slides machining large tractor bevel gear. Slides equipped with automatic lubrication. Power meter shows work being done by 50 hp driving motor.

Automatic Turret Lathes:

The Automatic No. 5 Ram: Job on small cast iron gear blanks. Two chuckings handled in single tool setup. Features Lynn Drive for fully automatic turret lathe operation on small part.

The 2F Fastermatic Tooled: Complete first operation on gear blanks. Tooling on six turret stations, plus

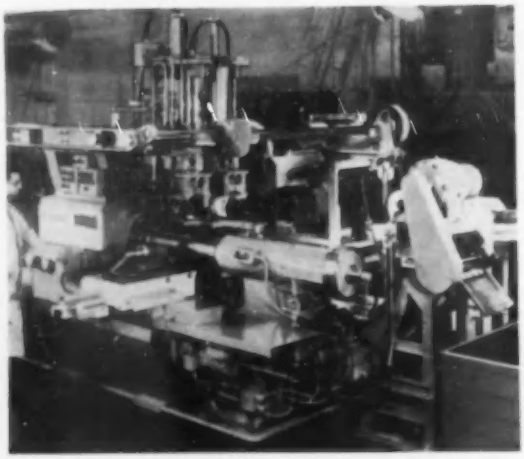


Gisholt Masterline 1SV1 vertical balancing machine

independent front and rear slides, handles all turning, facing, boring and counter-boring operations.

The 2F Fastermatic Cycled: Demonstration of newest setup features which reduce machine setup by at least 50 per cent. Master diagrams on selector panel give permanent record for future repeat job. Quick changeover makes practical lots of as few as 25 pieces.

(*Turn to page* 158, *please*)



Gisholt Masterline No. 24 automatic production lathe

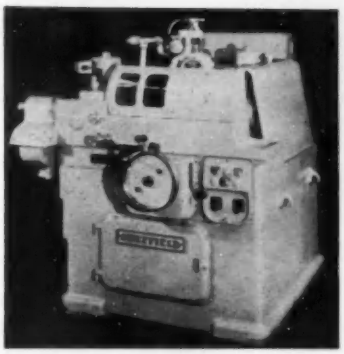
MACHINE TOOL SHOW

Sheffield—*continued*

in. in diameter. Maximum capacity between centers is four in.

The model 123 Micro-Form grinder is for grinding cylindrical work and circular form tools up to eight in. in diameter and eight in. in length. Work is ground directly from a drawing; neither templates nor masters are required. This machine features a heavy duty dead center circular grinding unit integral with upper table slide.

Gear grinder model 140 is designed for the production of precision ground helical and spur gears from 8 to 50 pitch. The grinding wheel is formed by the Crushtrue dressing process to the basic rack form and then finish



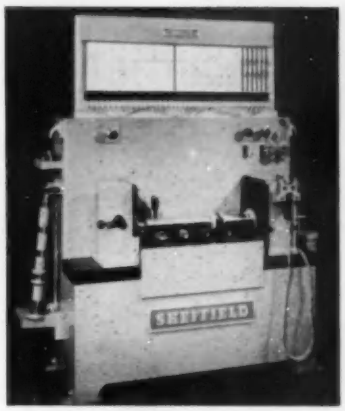
Sheffield model 101 precision thread and form grinder

dressed with a cam operated diamond dresser. Maximum work diameter is eight in. and the grinding stroke is four in. A number of gears of the same type can be ground in the same setup.

Model 300 Precision-Pak threading unit is an individually powered, automatic precision threading unit that can be mounted in any position from horizontal through vertical. It can be used also for boring, chamfering, and reaming.

Model 1000W Sheffield-Cavitron ultrasonic machine tool is used to cut, drill, emboss or transfer simple or intricate designs and shapes into and through hard, brittle metals and materials such as carbide and ceramics. Machining is accomplished by a cutting tool of the desired shape or form reciprocating at ultrasonic speeds and driving an abrasive grit solution against the workpiece chiseling away very fine particles to produce the desired shape.

Model 109 annular form grinder is for the rapid production by Crushtrue grinding of cylindrical forms such as circular form tools, ball bearing seals, seaming rolls, O ring groove grinding, aircraft and servo valves, automotive and farm implement transmission parts and other annular forms of intricate and precise profile. The machine has a capacity of 12 in. between centers and will grind a maximum diameter of four in. with a 14-in. wheel while accommodating work parts up to seven in. in diameter. It is available with a live or dead center workhead. Adjustable speed ranges from 64 to 1050 rpm. New features on this machine include an automatic grinding wheel infeed device, manually and automatically initiated.



Sheffield Precisionaire Crankshaft gaging machine

Automatic connecting rod gage for finish inspection of automobile connecting rods checks for bend and twist of the rod, thickness in two places at the crank end, the squareness of the crank bore to one face, the roundness of the crank bore, the diameter of the pin bore, and the selection and stamping of pin hole diameter in "tenth" steps. Various automatic gaging machines for checking bend of connecting rods, radial play of bearings, sizing bearing balls, strip-measuring and control units for grinders also will be displayed.

A 32-column Precisionaire cylinder block gaging machine will be shown for automatically gaging and classifying eight cyl bores for size, taper, and out-of-roundness and for marking each bore classification on pan rail. A 36-column Precisionaire crankshaft gaging machine inspects 43 dimensions and conditions on an automobile crankshaft quickly and accurately. An 18-column gage for inspecting jet engine blades for thickness, contour, twist, bow, lean, and centrality of root form to airfoil simultaneously and rapidly, also is included.

Plunjet gaging cartridges for use with Precisionaire equipment, limit-type gages, internal and external master gages, and many others will be on display.

Circle 24 on postcard for more data

GREENLEE BROS. & CO.

Booth 1221

To indicate its ability to build special machinery, Greenlee will have in operation one of three machines ever build for automatically producing solid-center auger bits from bar stock. It is used in Greenlee's own plant, making semifinished auger bits complete with a milled spiral and heading operations.

An automatic bar machine in operation will be a one-in., six-spindle model, tooled up for a part requiring such operations as drilling, reaming, lead-screw tapping, forming, recessing, shaving, stenciling, and thread rolling. It will be equipped with an air-feed arrangement for feeding out the bars and with the new ball-bearing spindles for high speed. There will also be an exhibit of standard attachments and tool holders.

The Tool Div. will be represented by products from the bit milling machine and by hydraulic benders for pipe, tubing, and rigid conduit. In operation will be a powerful, fast-acting bender, capable of bending extra-heavy pipe up to five-in. size. Also in operation will be the new light-weight bender for conduit and pipe up to two-in. diameter.

Circle 25 on postcard for more data

GALLMEYER & LIVINGSTON CO.

Booth 906

The following Grand Rapids grinders will be shown and demonstrated: A 30 x 25 x 72 in. production type hydraulic feed surface grinder, a 14 x 17 x 36 in. precision tool room type hydraulic feed surface grinder, an 8 x 12 x 24 in. precision tool room type hydraulic feed surface grinder, a hydraulic feed OD and ID grinder, hydraulic feed universal and tool grinders, and two sizes universal cutter and tool grinders.

The new hydraulic feed surface grinder No. 350 has 8 by 24 in. work table surface. Vertical movement is actuated by hand wheel on head. Large, outer wheel is graduated in thousandths, smaller (inner) hand wheel in tenths of thousandths.

Circle 26 on postcard for more data

BULLARD CO.

Booth 1213

Six machines in the new line introduced earlier this year will be on exhibit. On the vertical turret lathes and horizontal boring, milling and drilling machines, directional levers which operate the tool carrying heads are centralized on a movable pendant station. For the multiple spindle vertical chucking machine, head setting and tool adjustment is accomplished through convenient controls at each of the stations.

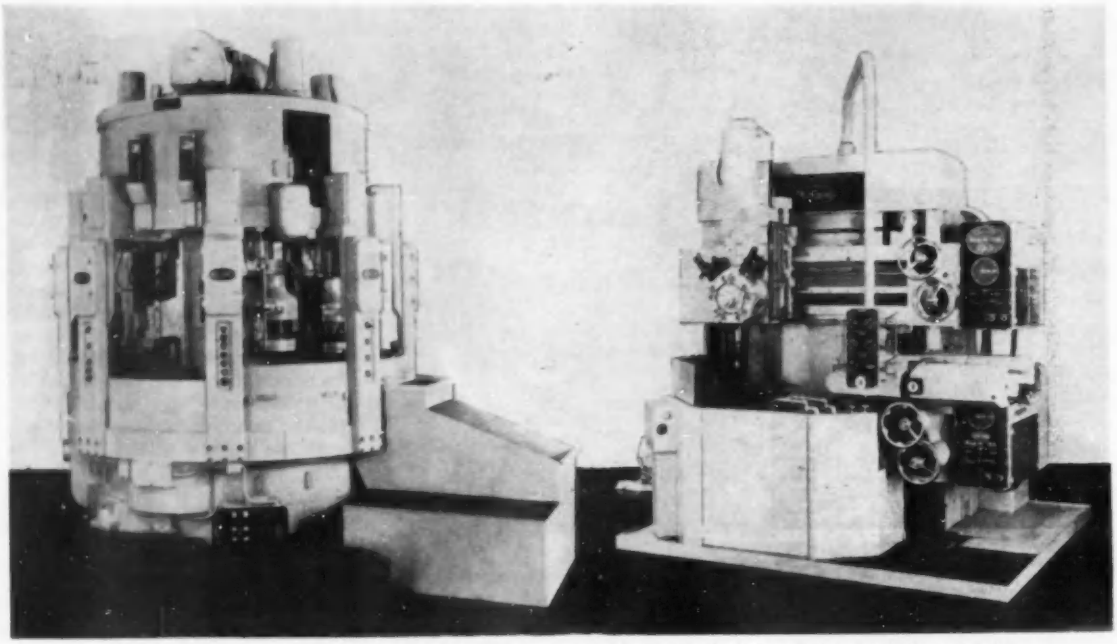
A 76-in. Cut Master vertical turret lathe, model 75, is the largest of six sizes in the line. Other sizes are 26, 36, 46, 56 and 66 in. This machine will feature the convenient movable pendant control that directs the feed and traverse of all heads, the selection of feed rates, the selection of table speed rates, and indexing of powered turrets. All heads have screw feed in both directions. The lathe contains a new type of table support bearing which is a combination radial and thrust roller bearing.

A 26-in. Man-Au-Trol vertical turret lathe, model 75, is a Cut Master converted to completely automatic operation by the installation of the Man-Au-Trol conversion unit. This unit may be purchased with the machine or applied in the field as production requirements dictate. It consists mainly of two rotary detector drums and a function drum which are electrically controlled. In effect, the detector drums tell the machine what to do and the function drums when and where to do it. This automatic attachment directs the machine through all the functions the machine is capable of performing. The control drum can be pre-set in advance and placed in the machine in a matter of seconds.

The new horizontal boring, milling and drilling machine, model 75, will be exhibited in two sizes—three and five-in. With the pendant all functions of the machine may be obtained: feed and traverse of spindle, head, table and saddle; selection of speed rates; rotation of spindle, head binder; and selection of feed rates in inches per minute or inches per revolution of the spindle. The spindle has both screw and rack feed, either of which can be selected by means of a switch on the head. Chromed hardened ways are provided for the bed and saddle. In addition, the five-in. machine will feature electronic automatic positioning which is available as optional equipment.

The new type L Mult-Au-Matic is available in three sizes: 10 in. with 6, 8, 12 or 16 spinles, 14 in. and 18 in. with six or eight spindles. Two machines of this type will be exhibited—a 10-in. 12 spindle and 14-in., 8 spindle. The 14-in. machine will feature an automatic loading device. The type L features higher spindle speeds, a faster indexing mechanism, a completely new screw feed works and simplified controls. Appearance also has been improved. Parts that were previously exposed are now integrated within the machine, eliminating possible safety hazards.

Circle 27 on postcard for more data



Bullard type L 14-in. Mult-Au-Matic with eight spindles, and the 26-in. Man-Au-Trol vertical turret lathe model 75.

CARBOLOY DEPT., GENERAL ELECTRIC CO.

Booth 109

Four new developments, some reported previously, will be shown for the first time. These include a new machinability computer, a cemented xide-base cutting tool which is still in laboratory stages of development, a new simplified tool holder for throw-away carbide blanks, and a method of carbide surfacing steel parts by a new bonding process currently under appraisal.

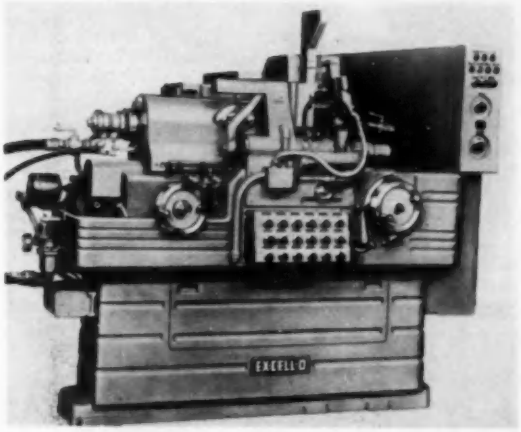
The lab-developed cemented oxide base cutting tool, as well as the new tool holder, will be in action on several of the new high-speed machines to be revealed by machine tool builders.

Circle 28 on postcard for more data

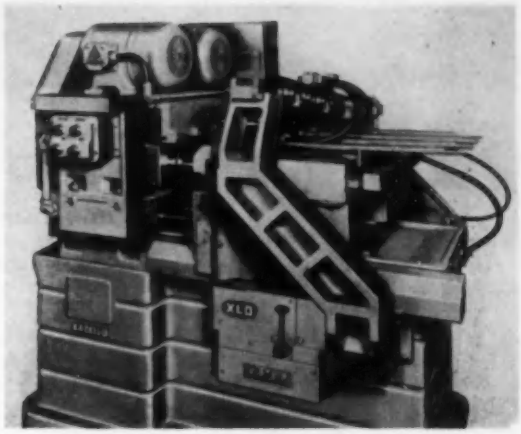
EX-CELL-O CORP.

Booth 1319

A complete new line of four tool grinders, ranging from precision grinders with six-in. wheels to heavy-duty machines with 14-in. wheels, will be displayed for the first time. All are double-end models with reversible motors for proper wheel rotation for both left and right hand tools. The grinding is done on the faces of plate-mounted wheels, resulting in straight surfaces and accurate tool angles. Large tool rest tables, adjustable to the required tool angles, provide firm support, and are also adjustable toward the grinding wheels to compensate for wheel wear. Silicon carbide, aluminum oxide or diamond wheels may be used to grind carbides, alloy castings or high-speed steels.



Ex-Cell-O internal thread grinder, style 39-A



Ex-Cell-O precision boring machine, style 112-D

The precision tool grinder, style 44-A, is especially suited for sharpening carbide tools with diamond wheels. It has a precision spindle, driven by a built-in motor. A pressure coolant system is provided. An internal thread grinder with automatic work handling equipment, the standard Style 39-A, will be equipped to receive work from a conveyor, finish grind the thread automatically and eject the completed parts upon an endless belt for delivery to another conveyor.

The workpieces are ball race nuts, used in steering gears, where anti-friction balls circulate between the nut and the screw. The thread form is first cut by an Ex-Cell-O Scru-Broach, and the parts are heat-treated prior to the thread-grinding operation. The start of the thread must be held in relation to a keyslot in the outside diameter of the nut.

In operation a loading arm picks a part out of a loading chute, pivots down, thrusts the work into the chuck, rotates the part until a locating key drops into the keyslot, then the chuck jaws clamp and the arm retracts. The wheel slide comes forward and the work rotates and reciprocates in contact with the wheel. When the thread is ground to size, the wheel retracts and the chuck releases and ejects the finished part.

The thread is a gothic form, and the grinding wheel is shaped to suit by a motor-driven diamond dresser. The grinding wheel is dressed as part of the automatic cycle.

A Style 112-D precision boring machine for finish boring valve lifter bodies at the gross production rate of 1200 pieces per hour will be in operation. The machine is a single-end hydraulically operated model with a new hydraulic control panel. It will be shown with work handling equipment to receive parts from a conveyor, direct them into loading chutes, insert into chucks and eject finished parts to another conveyor.

Workpieces are cast iron, and the operation is finish boring blind holes 9/16" in dia. and 1 in. deep. Four precision boring spindles carry the tools for completing four parts during each machine cycle. If one of the parts comes to the machine with the hole at the wrong end the machine stops. Also, an interruption in the flow of parts causes the machine to stop.

Other Ex-Cell-O precision boring machines on display include both single- and double-end hydraulically-operated as well as two cam-operated models. All the hydraulic machines will be equipped with the new hydraulic control panels.

The largest machine is the Style 49-A, a heavy-duty grinder for fast reconditioning of all tool materials. It is suitable for rough grinding all sizes of tools, and for both roughing and finishing large tools of high-speed steels and cast alloys. Fourteen-inch wheels cut fast, and a pressure coolant system floods the work to prevent localized build-up of heat, which is especially harmful to carbides.

Those who prefer to use separate grinders for roughing and finishing, specify Style 48-B or 49-A for roughing operations, and 44-A or 46-B for finishing.

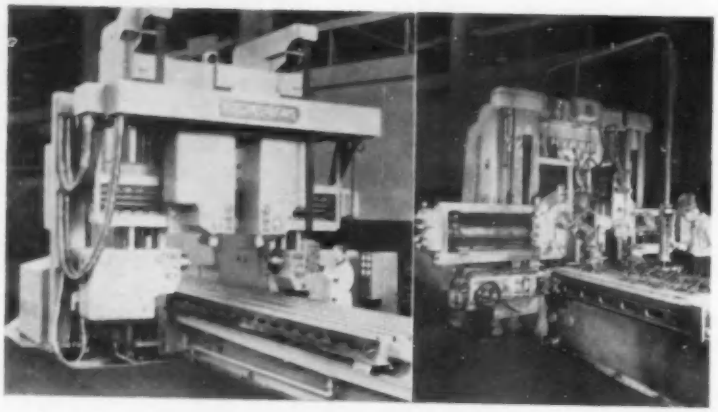
Circle 29 on postcard for more data

SIZE CONTROL CO., DIV. AMERICAN GAGE & MACHINE CO.

Booth 417

Low cost master ring gages made within ±0.0002 in. of size will be shown. Used for gaging and setting indicating bore gages and inside micrometers, these new master rings have exact size shown on master to four decimal places, accurate to 0.0001 in. in roundness, straightness, and taper, non-accumulative. Available from 0.1870 to 3.000 in. (larger sizes available in AGD tolerances), Boremaster is made from tool steel which has been hardened and stabilized throughout. The finish is honed four to eight microinches.

Circle 30 on postcard for more data



G&L Hypro planer-miller with 10-in. quills, left, and Hypro extra-heavy double housing planer.

GIDDINGS & LEWIS MACHINE TOOL CO.

Booth 710

Two of the largest machines at the show will be in operation at the G&L booth. The Hypro planer type milling machine has four 10-in. quill heads. Each is powered by a 50-hp water cooled motor. The heavy table is driven by a d-c motor through a combination cone worm and wheel and double spur gear and rack, for accuracy in climb milling.

Controls are grouped on a pendant, with auxiliary controls on a panel on the right side of the machine. Each head also has five push-buttons and feed selector. A feed reel device keeps hoses and wiring cables out of the way. In addition to rigid clamping units for all moving members, a hydraulic counterbalance system is employed.

Also featuring a high-capacity table drive will be the Hypro double housing planer. It will be planing cast iron and steel at 400 fpm. This huge machine has dual saddle and slide controls, power cross feed to side heads, electric rail clamp, and tool lifters for side and rail heads. The motor drives the table at 25 to 400 fpm through twin helical gears. All screws, feed rods and rapid traverse shafts have anti-friction bearings.

Other machines being introduced include an intermediate size floor-type, precision single-spindle horizontal boring, milling and drilling machine. The 460 FUAR is the first in the 40 series, featuring a six-in. spindle driven by a 30-hp reversing a-c motor on the headstock. The motor provides 32 speeds from three to 800 rpm, with 72 feeds. All controls, including inching, are under power. An optional underarm support for the milling spindle can also be used as a shaper for slotting.

Vertical turret lathes will be shown for the first time. Each head has independent feed and traverse with directional controls to both ram and saddle. The five-position right turret head can be indexed in either direction, and clamped positively. Heavy tool holders or bars can be face mounted. A choice of rail head types is offered. The side head is enclosed and protected where needed. The table is on preloaded tapered roller bearings, and driven by a 50-hp motor at six to 320 rpm in 24 steps.

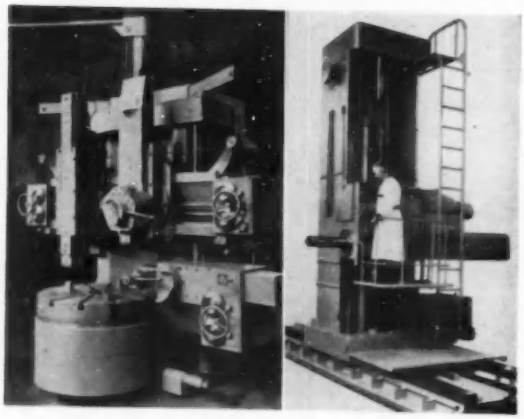
A horizontal boring, drilling and milling machine to be exhibited for the first time features a 30 by 36-in. revolving table with 36-in. cross travel. It provides independent operation of headstock, table and saddle in either direction. Spindle speeds range from seven to 1600 rpm.

An elevator for the operator is built into the model 570-FUAR floor-type precision horizontal boring, drilling and milling machine. It will have an attached hoist for handling heavy accessory attachments. The machine has a seven-in. spindle with a 75-hp motor.

Lubricant cooling will be demonstrated on a 30 series horizontal machine. With this system close dimensional tolerances can be maintained without special air-conditioning. The system does not hold constant lubrication temperatures, but controls the variation.

Two-dimensional tracer control will be demonstrated on a Hypro heavy duty vertical boring and turning mill. Other features of this machine are a constant surface speed attachment and indicator, and a constant chip thickness control.

Circle 31 on postcard for more data



G&L 42-in. vertical turret lathe and 40 series precision floor type horizontal machine

LOGANSPORT MACHINE CO.

Booth 1114

The following items will be on view:

The new line of Logansquare air cylinders. This will be the first showing of the new line of square covered air cylinders.

Hydraulic display stand, showing a simple hydraulic circuit in operation.

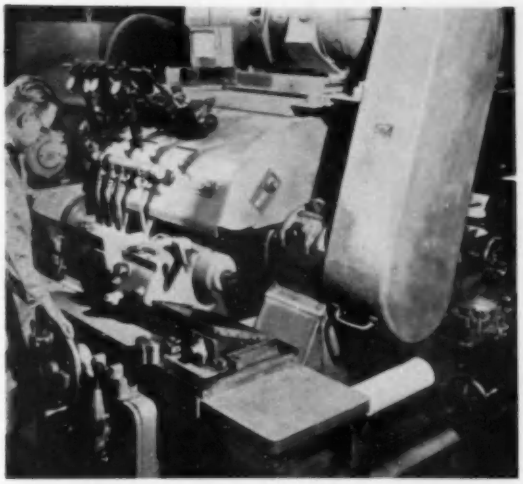
Regulator, filter and lubricator stand which shows how lubricant is administered to the air components.

A Sundstrand production lathe, equipped with a Logan P.R.O. chuck and Logan rotating Air cylinder.

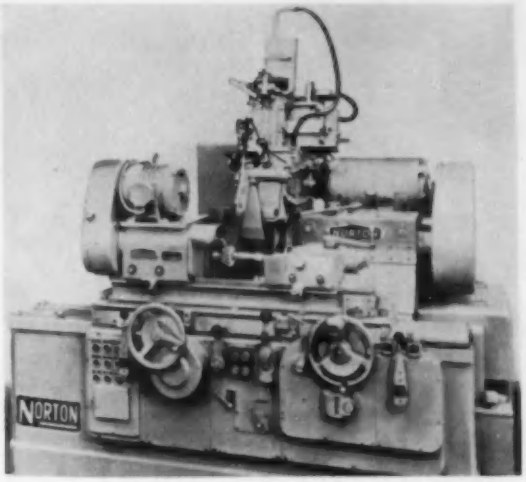
Air-Draulic cylinder display.

Automatic liner turning machine, which illustrates how air equipment is adaptable to automatic equipment.

Circle 32 on postcard for more data



Norton multi-wheel grinder, Type CM-1



Norton 10-in. cylindrical grinder, Type CTU

NORTON CO.

Booth 516

Five grinding machines, not previously exhibited, will be shown, the automatic transfer type crankpin grinder, multi-wheel grinder, universal grinder, Type U-4, semi-automatic angular wheel slide grinder Type CV-4, and the No. 3 Cam-O-Matic cam grinder. A sixth machine, the Type CTU cylindrical grinder will feature new equipment.

A two-station crankpin grinder, built especially for the show, will be demonstrated. This will be a completely operating unit, built upon one base section instead of the normal two, in order to conserve space.

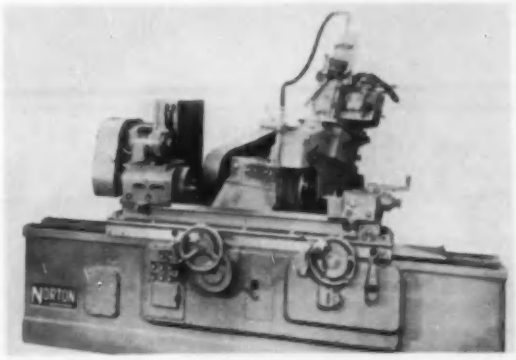
The No. 3 Cam-O-Matic automatic cam contour grinding machine shown will be one of the first to come off the production line. The new cam grinder has been designed for faster grinding of automotive type camshafts with better finish. The machine has simpler and sturdier construction details than earlier models. The use of a Gilmer timing belt produces a positive work drive with resulting smoother work rotation since slippage is eliminated, resulting in better cam contours.

The multi-wheel grinder is designed to grind multiple diameters on a single shaft. Thus it complements the transfer type crankpin grinder, as it is well suited to grinding the mains of the crankshaft before the pins are ground.

The universal grinding machine, Type U-4, provides extra versatility through simplified setups and fast, precise grinding action for limited production items. The principle new feature is the swiveling headstock which has a dog drive plate on one end and a five in. D-1 cam lock nose on the other for mounting chucks or fixtures. A work speed range of 40 to 400 rpm in an infinite number of increments is available at the touch of a dial. No direct current is required since the headstock drive is controlled through rectifiers. The angular wheel slide grinding machine replaced the Type C angular machine. Faster sizing qualities and simplified operation are features of the new machine. When equipped with the wheel guard truing device, this machine provides even simpler operation. The operator can true the wheel at the touch of a button in less time than would be required for manual truing. Heavier construction has been incorporated in many of the mechanisms to provide better finish with faster grinding.

The Type CTU cylindrical grinder is available with a wide variety of standard or special equipment. Wheel guard truing is available.

Circle 33 on postcard for more data



Norton 10-in. angular wheel slide grinder, Type CV-4

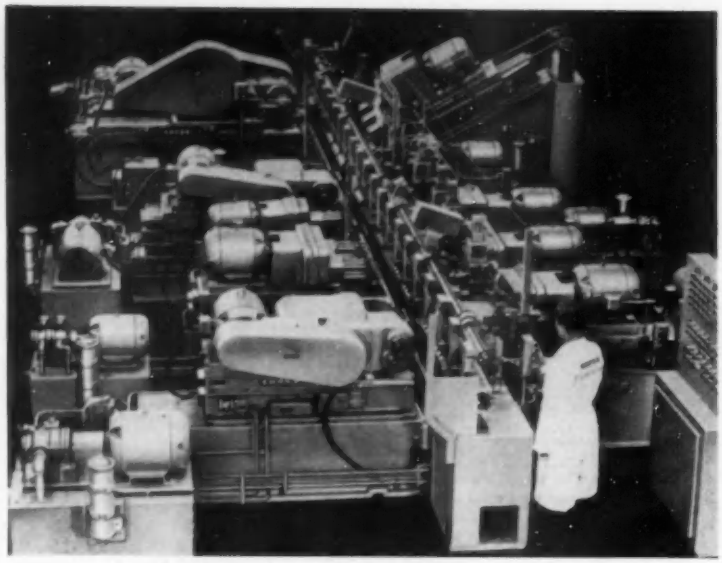
FELLOWS GEAR SHAPER CO.

Booth 1416

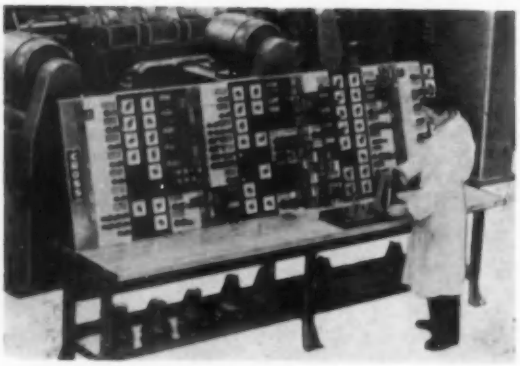
The following types of equipment will be displayed:

Gear cutting machines, automated line of two gear shapers and one shaving machine with chamfering attachment, complete with transfer units, automatic loading, cleaners, sizers, etc.; fine-pitch gear shaper with deburring attachment; fine-pitch shaving machine with deburring attachment; spur cutter sharpening fixture; involute measuring instrument; lead checking instrument; instruments for checking gear errors in combination.

Circle 34 on postcard for more data



Cross Transfer-matic for machining crankshaft main bearing cap.



A typical Cross machine control unit.

CROSS CO.

Booth 1118

On display will be a Transfer-matic for machining a crankshaft main bearing cap cluster. It turns out 450 pieces per hour at 100 per cent efficiency. It comprises 19 stations: one for loading; three for milling; eight for drilling, chamfering, reaming and tapping; and seven for visual inspection. An automatic transfer mechanism indexes the parts from station to station. Gravity operated cam clamping and tandem drive for the locating pins are other features. The machine has hydraulic feed and rapid traverse for milling, drilling, reaming and chamfering, and individual lead screw feed for tapping. Many standard parts are interchangeable, and construction meets JIC standards. Details include hardened and ground ways and an automatic lubrication system with oil-mist lubrication to the taps. A drag chain type chip conveyor is built in.

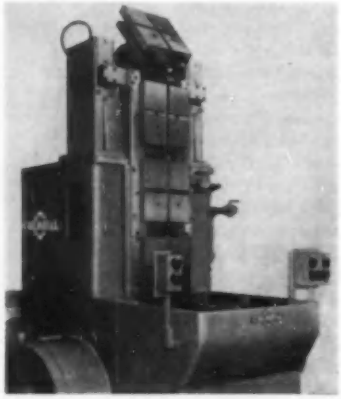
The machine control unit for programming tool changes also will be displayed. Toolometers, incorporated in the unit, automatically stop the machine when the tools need changing. Gages are provided to preset the tools, thus eliminating the need for machine adjustments and trial cuts. Two complete sets of tools are stored in the unit. The Toolometers also provide for the grouping of tool changes to minimize work stoppage. The control unit is available in four sizes.

Circle 35 on postcard for more data

COLONIAL BROACH & MACHINE CO.

Booth 1112

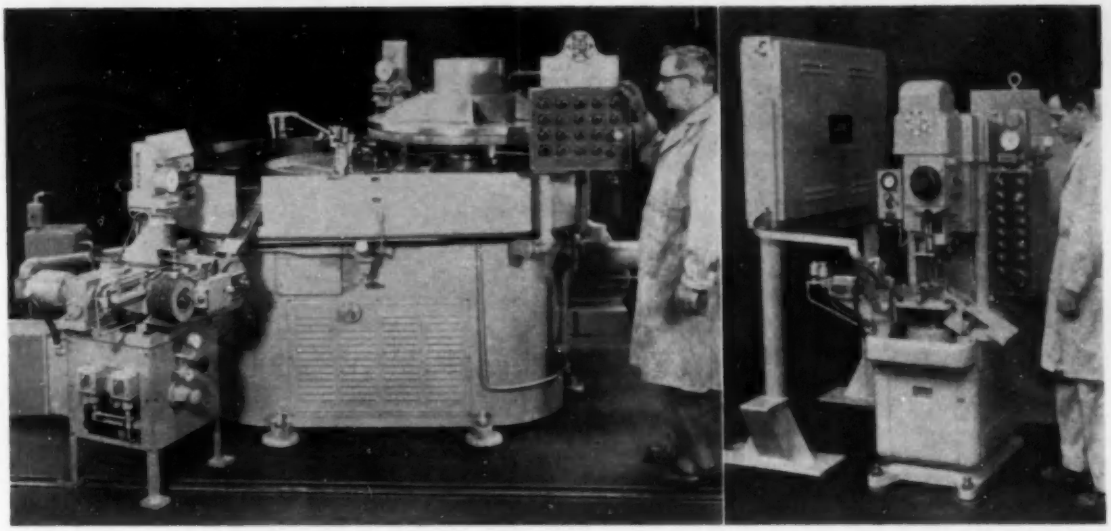
The new Colonial "One-Way" achieves continuous metal removal by mounting a series of broach carriers on an endless chain. Broach carriers move downward on the front of the machine, entering precision ways before contacting the work to insure accuracy. The part being broached remains stationary in suitable holding fixtures on the work platen. After entering the ways, the broach carriers become individual rams. The chain applies only down-pull on the ram; gibs and ways support the ram while broach teeth are cutting, as with conventional surface broaching.



Colonial "One-Way" broaching machine

The chain broach principle provides greatly increased length of broaching stroke in a relatively compact machine. The Model VCA-10-150 One-Way machine stands only 11-½ ft high, but has an effective broach length of 12 ft, 10 in.

Equipped with a mechanical drive, including variable speed unit, the machine has infinitely variable cutting speeds from 10 to 50 sfm. The wide face for mounting broaches on the chain-mounted rams and the wide work platen to handle indexing or stationary fixtures, permit installation of multiple tooling for simultaneous broaching of the same or different parts side by side. If parts being broached require less than half of the available stroke (12 ft, 10 in.



Pinion gears will be initially processed on a new Micromatic model 836-2 Microflat machine, followed by bore honing on an automatic model 738-C Microhoner.

MICROMATIC HONE CORP.

Booth 1211

Among the exhibits will be a new method of processing pinion gears. The gear blanks are first put through a new automatic model 836-2 Microflat machine. This is a Paral-Flat operation, generating the two end faces of the gear parallel and flat, thus establishing control surfaces for subsequent processing. Production is 1200 gear blanks per hour.

This completely automated machine has automatic loading; feedback to compensate for abrasive wear, controlled by an air gage that checks the thickness of each part; automatic ejection and gaging for parallelism. Dressing of both abrasives simultaneously, without dismantling the machine, makes this operation fast.

The bore of the gear blank is then Microhoned round, straight, to size and square with the parallel faces. This "square-axis" operation is performed on an automatic model 738-C Microhoner. As the blanks are automatically fed into the machine, they are located by the tool and clamped. The new diagonal stone tool, controlled by a new-type Microdial automatic feed, generates a true bore. Final size is assured by a Microsize control. As the part leaves the Microhoning station, and while it is still on the machine table, it is checked by an automatic air gage which initiates segregation. This machine produces 120 parts per hour, removing approximately 0.004 in. stock from each diameter. Size is held to less than 0.0003 in. tolerance, and taper and out-of-roundness less than 0.0001 in.

Circle 36 on postcard for more data

---

on the standard machine), duplicate tooling may be installed in sequence on broach carriers and controls, modified to provide two or more complete broaching cycles for each revolution of the chain. Similarly, with suitable broach spacing and control stops, two parts requiring a short stroke, and one part requiring a long stroke, can be broached side by side during a single revolution of the chain.

Of unusual interest is the fact that the tower of the machine is so constructed that it may be raised with extension inserts, and a longer broach carrier chain installed. Additional carriers may then be attached to the chain, increasing the effective broaching stroke to as much as 18 ft.

Circle 37 on postcard for more data

THOMPSON GRINDER CO.

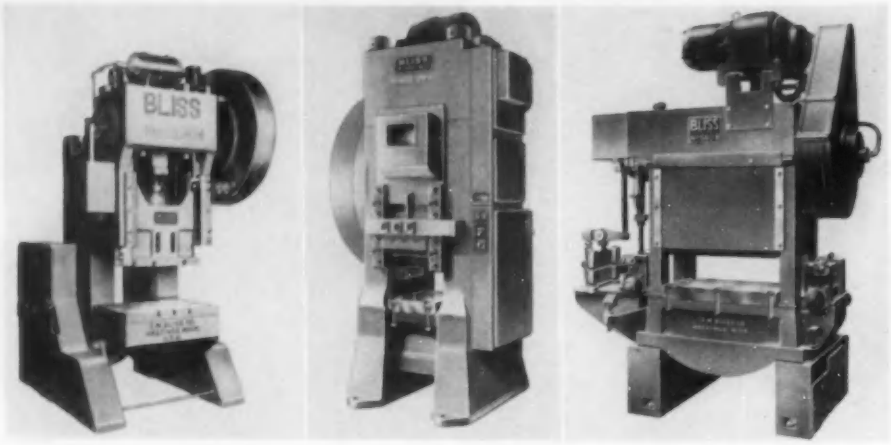
Booth 1407

Introduction of its 6 by 10 by 18 in. type D hand feed surface grinder of extremely rugged design will be made. The machine features anti-friction bearings throughout, including the table cross slide and elevation slideway bearings. The bearings are hardened tool steel precisely ground with contoured race-ways with all bearings pre-loaded to confine these important slide movements in an accurate, straight plane. Each slide is pre-lubricated.

A cross feed screw and elevating screw is of the anti-friction type, hardened and ground, which gives a minimum of effort in movement with extreme sensitivity. The cross feed is accomplished by the movement of the wheel head mounted in the column and the entire unit has a cross travel of 6-½ in. Both the cross feed and the elevation units are equipped with vernier adjustments permitting the accurate feeding of these movements within 0.0001 in. Large graduated dials are furnished which may be reset quickly and accurately to zero. The machine features three-point leveling to simplify this very important detail for precise grinding.

The machine is equipped with standard cartridge type anti-friction spindles, commercially available from numerous sources. It can also be arranged for vertical spindle operation.

Circle 38 on postcard for more data



The Bliss 75-ton enclosed inclinable press, 400-ton coining press, and short stroke high production press.

E. W. BLISS CO.

Booth 1414

Four completely new lines of presses will be introduced at the show, including inclinable, straight side, knuckle joint and high production presses.

Bliss will also exhibit recent developments in such auxiliary equipment as a new air friction clutch, automatic feeds, and a new automation control switch. Four motion pictures in color and sound on the subjects of press maintenance, automotive and appliance industry uses of Bliss transfer feed presses, and on the Bliss-Crary tonnage limitor, will be previewed.

A 75-ton model OBI press to be shown with new air clutch features a totally-enclosed frame design and box-type crown. In addition, this series has a motorized inclining mechanism, a new automatic rotary limit switch, return oil system and Type-M clutch, a combination clutch and brake mounted on the crankshaft. Sizes run from 75 to 200 tons, and the die spaces of all presses in the line conform to JIC standards as do electrical controls. The motorized inclining adjustment permits an inclination of up to 20 deg without a pit. Press controls can either be built into the box-type legs or mounted on the frame. Slide adjustments can also be motorized. Other features include bronze liners in the slide, extra-long gibbing and wrist-type connections. Designed to receive Bliss-Marquette die cushions, the cast Meehanite frame presses are also built to receive Bliss feeds and other accessories.

A 400-ton knuckle joint model will be fitted with special dies to emboss a souvenir medallion. Designed especially for coining, extruding, sizing and other work needing powerful pressure close to bottom stroke, this model features new motorized wedge-type slide adjustment which eliminates the need for a separate top lock device and compression springs. This suspension is self-locking at any point of adjustment. Reciprocating parts are air counterbalanced. The press also has two independent, motor-driven lubricating systems, each interlocked against pressure failure: one for circulating cascade lubrication to the knuckle link system; one for other press bearings. Modern electrical controls are arranged in semi-flush mounts. Existing design features retained include massive frame members, hardened steel knuckle pins and bushings, and an air friction clutch.

Recently introduced, a 250-ton two-point press on display is typical of six new lines known as JIC enclosed presses. Two feature the underdrive design, embody JIC specifications and are completely packaged, ready for installation. All wiring, piping and controls needed to actuate the many automatic devices mounted on them are built into the uprights. Other features include automatic recirculating oil systems, motorized plunger and blankholder adjustments, and high-speed air or electric clutches.

The so-called automation switch is a mechanical rotary limiting device designed to control electrically the stopping, starting, interlocking, motion, time, sequence and recycling of press accessory equipment such as feeders, unloaders, kickers, lifters and dopers. Designed for high speed operation, it can control nine separate circuits, and give independent and infinite adjustment of each circuit without stopping the press. It also has normally-open and normally-closed terminals for each circuit. Adjustments within one deg from zero to 360 deg of every control switch in the device are possible by means of a calibrated thimble and stem arrangement similar to that of a micrometer. Built to surpass JIC standards, the switch can operate in either direction with equal efficiency, although clockwise is standard.

A short stroke, high production press is capable of speeds in excess of 450 spm. Controls have been removed from the press and mounted on a separate pedestal. Linked to the press by cable, it can be moved about to give the operator greater mobility. Within the right leg of the press is contained a return oil system, consisting of a large oil reservoir, filters and pump. Electrical interlocks in the oil lines guard against pressure increases or decreases. The feed mechanism has been completely-redesigned and now has a new rack and pinion drive and a new over-running feed clutch, a newly-designed scrap shear as well as other new design features.

Circle 39 on postcard for more data

AJAX MFG. CO.

Booth 1309

Three types of forging equipment will be on display. They will include a 500-ton Ajax forging press, a No. 0 Ajax forging roll and a three inch Ajax forging machine. Incorporating the latest features in forging machinery design, the machines will demonstrate the production of forged parts.

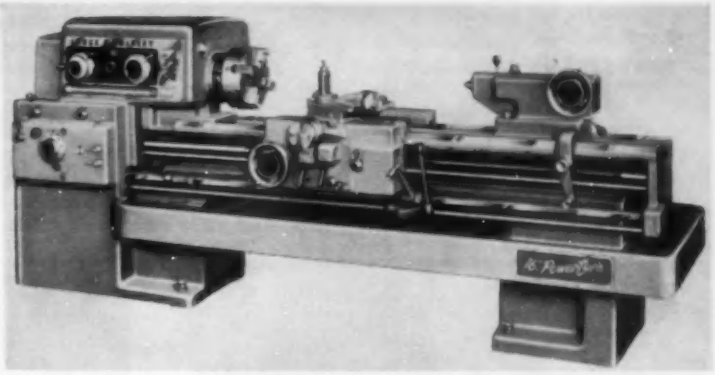
Circle 40 on postcard for more data

LODGE & SHIPLEY CO.

Booth 502

Featured in this exhibit will be the 16-in. Powerturn toolmaker lathes. They have a computing head which merely requires setting of two dials, and correct settings for the three-speed shifting levers are instantly indicated. All controls have been regrouped for convenience. A positive brake is quickly released for shifting. A built-in horse-power ammeter indicates the amount of the lathe's capacity being utilized. Greater swing over the cross slide is designed to result in more swing capacity. A micrometer carriage dial shows movement of the carriage directly in 0.005 in. increments. A tilted index plate for feeds and threads, and direct reading cross feed and top slide dials, are other features. The lathes are available in 15 models and sizes, 13, 16 and 20-in. standard in engine, toolmaker, gap manufacturing and Copymatic types.

Two new 10-in. Hi-Turn lathes will be part of the display. Recently introduced, this lathe designed for production operations offers five hp, and speeds to 3000 rpm. One will be set up with standard tooling, including a four-way tool block and rear tooling, machining a cross feed friction stem. Another will be operating with an Aloris tool holder and rear tooling on the cross slide while other tooling on the new bed turret will combine for drilling, boring, turning, facing, chamfering and necking a hollow aluminum shaft. This lathe has nine spindle speeds from 3000 down to 202 rpm, totally-enclosed quick change gear box, built-in four-way tool block, dual direct-reading micrometer cross feed dials reading to 0.001 in., and automatically operating template type length stops.



L & S Powerturn 16-in toolmaker's lathe

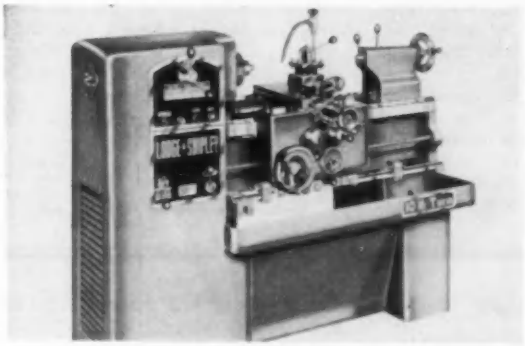
The Type OT-lathe is the most versatile of eight models, since it can be used for contour facing as well as contour boring or turning, all on one carriage. The single carriage is Copymatic equipped for contour facing, turning and boring through a 45 deg tracing slide and has a 90 deg standard cross slide as well. Its universal function is obtained because it can follow either the facing template or the turning and boring template with individual tracing heads. The T-lathe will be contour facing and boring an aluminum compressor rotor wheel for a jet engine. The workpiece is not an actual engine part, but is representative of the large diameter, short length work for which the T-lathe was designed.

The No. 40 by 24-in. Floturn lathe will be tooled for, and working on a complicated jet engine part. The first operation takes the 14 in. diameter flat blank into a conical shape with a flange. The second operation reverses the direction of metal flowing, producing a second conical shape (in the opposite direction) around the first. The third operation again reverses the direction of metal flowing, producing a third conical section in the same direction as the first.

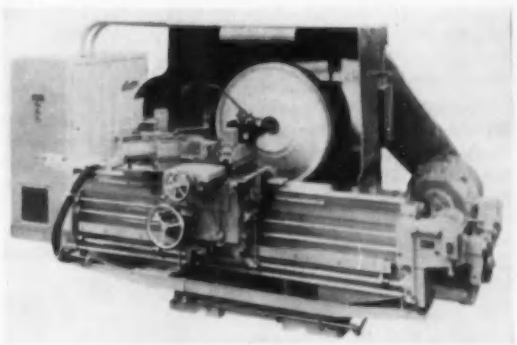
Although the Show shear will be equipped with the Hydro-Hold holddown system, the firm will introduce an even newer holddown system which features a "no mar" operation. Using an air/oil/electric system, the holddown fingers are brought down on the material gently then, tremendous holding power is exerted before the blade cuts.

Among other new features, the Model 0610 shear has: inclined blade cutting, air counterbalances, automatic lubrication, back gage and indicator.

The Hamilton Div. will display a model 180-10 power press brake. Among its features are an exclusive wedge type ram pressure release, motor-operated micrometer ram adjustment with direct-reading indicators, showing vertical adjustments in 0.001 in. increments, and a specially designed air clutch and brake. The capacity is 10 ft. x 5/16 in.



L & S Hi-Turn 10-in. lathe for production



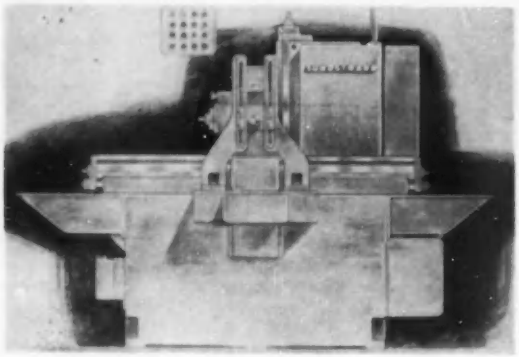
L & S T-lathe, type O, equipped with Copymatic

Circle 41 on postcard for more data

SUNDSTRAND MACHINE TOOL CO.

Booth 1412

The new hydraulic feed Rigidmil C1 will be tooled up for an indexing job with the part held in a hydraulic fixture. A model C3 will be used to demonstrate the new lines of mechanical feed Rigidmils. This machine will be provided with a magnetic fixture and will be tooled up to mill four sides of pie-shaped cast iron segments.



Sundstrand hydraulic feed Rigidmil model C1.

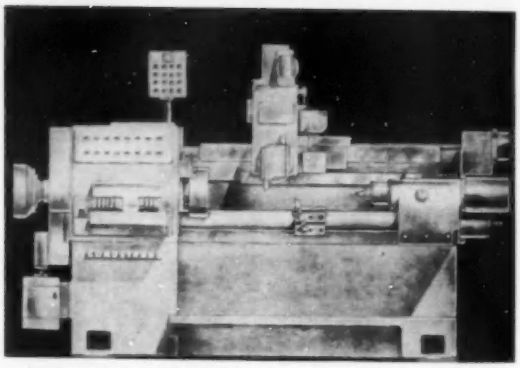
The model C1 is a new small milling machine of five hp capacity. This machine will have hydraulic feed to the 10½ by 150 in. table and a maximum stroke of 24 in. Any length of combined feed and rapid traverse within the maximum stroke can be obtained. The feed range is from one to 100 ipm with rapid traverse of 350 ipm.

Hydraulic pump valves and controls are all panel mounted on the rear of the machine and in accordance with JIC standards. All are readily accessible for adjustment or service. The table feed circuit for the standard machine is arranged so that hydraulic clamping can be added without changing circuit. Oil is available for fixture clamping up to full capacity of the pump (7½ gpm) and constant pressure maintained on the clamping circuit during the entire table cycle. The standard speed range is from 50 to 1500 rpm.

The larger C3 has a newly designed head for heavy duty milling. It has a speed ratio of 16 to 1, and the spindle speed ranges from 40 to 640 rpm. The spindle is powered by a 15-hp motor. Speed changes are by pick-off gears and four different speeds can be obtained with each set of two gears. Power feed to the table is provided by a screw, mechanically driven to assure a consistent and positive feed. A back lash eliminator assures the practical application of climb milling. This same type back lash eliminator is used with the head feed screw when the optional vertical feed is furnished. Provisions for the installation of a chip conveyor without additional changes are designed into the features of the machine. Table cycles are automatically controlled by easily adjusted dogs that control the table movements for a wide variety of cycles including two way cycles with skip feed, reverse from feed to feed and two feeds in each direction of the table. Spindle speeds range from 15 to 3530 rpm with the horsepower varying from five to 100 hp.

Also shown will be a small contour milling machine, and a model 55 heavy duty machine processing large dies.

Turning on two types of lathes will be demonstrated. One of these will be a model 8A automatic, provided with a multi-cycle tracer control slide. This machine will have a new style bed with a built-in automatic chip removal unit. The second lathe, to be shown, will be the new model 14 multi-cycle single point production lathe. It will have a new punch card controlled programming attachment (not illustrated), making it possible to change speeds, feeds, carriage movements and indexing of the tool turret by merely changing the punched card. The new single end milling and centering machine will be used to prepare the shafts turned on the two lathes.



Sundstrand model 14 multi-cycle single point production lathe

Circle 62 on postcard for more data

BESLY-WELLES CORP.

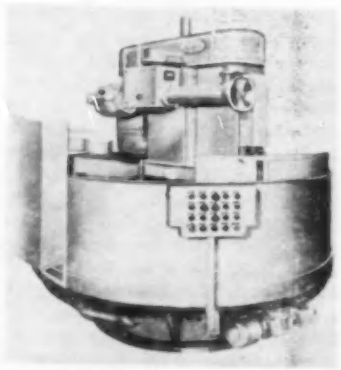
Booth 911

The Model 240 double horizontal spindle grinder, will be shown for the first time. This new grinder is equipped with an electro-magnetic feeder unit that delivers work between the disks in a steady stream.

The 240 is entirely automatic. Even dressing of the two disks with separate dressers is by a push-button control. Individual mounting of dresser arms assures squareness with the head, regardless of alignment. All controls, motors, starters and hydraulic units are enclosed.

The grinder is constructed with an improved sealed spindle quill. Formica is used on the ways to improve accuracy. This quill design seals out grit, permits smoother and more accurate adjustment of the disks.

A simplified face grinder will also be on display. Model 711 Besly-Bowen radial head face grinder has been designed with all movements mechanically interlocked for push-button con-



Model 711 Besly-Bowen Radial Head Face Grinder

MICHIGAN TOOL CO.

Booth 1220

So-called Gear-O-Mation, the application of automation principles to the production of gears and splines, will be featured. It will be applied to loading, unloading, cleaning and checking of parts for size, and automatic size control for the machines.

Three production lines on display will be: An automatic gear production line—from blank to finished gear. Blanks are fed to a model 1445 universal Ultra-Speed hobber equipped with automatic loading. The gear then goes through a Michigan gear washer to remove chips, then through a three-way gear classifier that passes the correct size gears and rejects over-size or under-size gears through separate chutes. In the event that gears check under-size or over-size, a feed-back system activates an automatic center distance regulator, integral with the hopper, and makes the required adjustment to bring the hobbed gears within the specified tolerances.

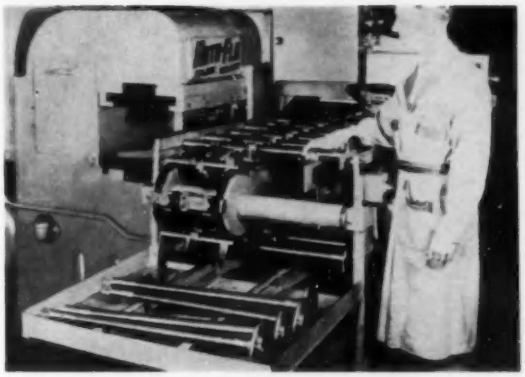
A conveyor carries the correct-size gears to the hopper that feeds the Model 870 underpass gear finisher. After the gears are shaved, they pass through a second washer and a three-way classifier that is also equipped for size control of the shaving machine.

A Shear Speed gear shaper, complete with automatic loading and sizing, will be shown for the first time. All teeth in a gear or similar toothed part are formed simultaneously on the Shear Speed, which accounts for its high-output rates. Gears with adjacent shoulders are cut as easily as straight gears.

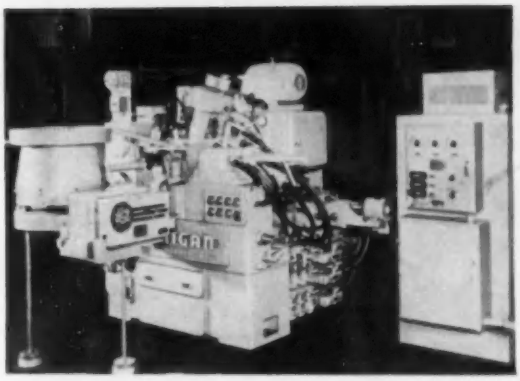
After the gears are formed, they pass through a Michigan gear washer to remove chips, and then through a 3-way gear classifier for size check. A feed-back system actuates the integral automatic sizing unit on the Shear Speed gear shaper, so that all gears are within the required tolerances.

The new Roto-Flo spline roller, with automatic loading and handling, will be forming involute splines on steel shafts.

Circle 67 on postcard for more data



Gear-O-Mation equipped Roto-Flo spline roller



Model 1445 hobber equipped with hopper feed

trol. This grinder permits continuous production with an automatic grinding cycle at one rotary work table, while loading is in progress at a second table.

A precision grinder that gives high production on small parts, the Model 910 is the third new machine. It grinds two surfaces parallel in one pass between the twin abrasive disks and can be fixtured for a variety of shapes and piece sizes. The rotary feed wheel on the 910 has been made extra large for easier loading by hand. In some cases, it can be fully automated.

Other equipment at the Besly booth will include the Model 318 Tub Grinder for snagging castings and generating flat surfaces for locating on magnetic chucks, a display of Besly's complete line of high speed cutting tools.

Circle 44 on postcard for more data

W. B. KNIGHT MACHINERY CO.

Booth 418

Workpieces up to 30 by 48 in. and weighing up to 5000 lb can be drilled, bored or vertical milled on the Electromill. All controls are located in a single panel that may be moved to the most convenient position—front, back or side. Easily maintained direct drives assure smoothness of operation. Variable speed motors offer infinitely variable speeds and feeds. With 35 in. of throat capacity, large work can be completed with only one setting for greater accuracy and operating speed.

No. 50 vertical milling and precision boring machine will be displayed. It is a stationary bed-type machine with unusual cross travel.

A medium capacity jig boring machine, the No. 25 Jigmaster offers exceptional speed in changing tools. Greater accuracy with complete table and saddle support. Fast table settings and convenience of controls reduces time on precise location of holes.

Vertical or horizontal milling machines can be adapted for power circular milling or indexing with the new 42-in. power-feed rotary table. Entirely self-contained with motor drive, no feed connection to the milling machine is required. The table is equipped for infinitely variable feed. T slots are optional. With the use of sub-plates, table diameter may be increased up to 60 in. Tables are furnished with standard equipment for usual work. Index plates and special electric equipment are available for out-of-the-ordinary applications.

A hole grinding attachment to be shown is said to be easily mounted on the vertical spindle of any jig borer or milling machine for grinding holes ¼ to eight in. diameter.

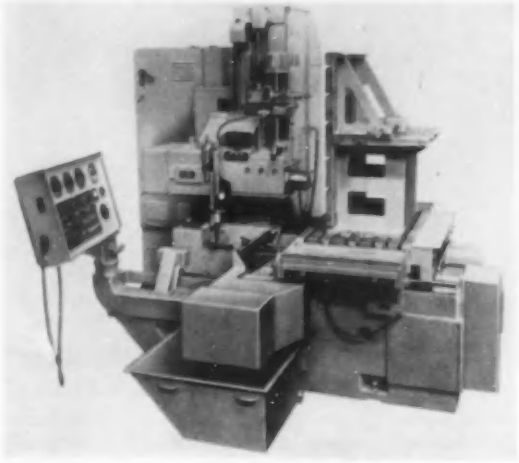
Circle 45 on postcard for more data

PRATT & WHITNEY DIV., NILES-BEMENT-POND CO.

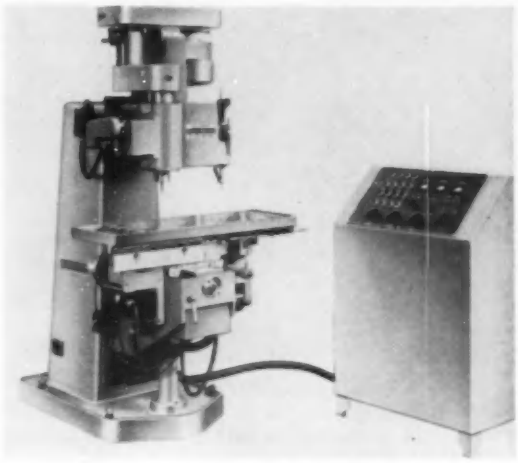
Booth 1219

New equipment at this exhibit will include automatic lathes, a grinder, tracer milling and die sinking machines, Keller machines, rotary tables and automatic gaging machines.

A new model BL Keller tracer-controlled milling machine, designated the BL 3622, Model C, retains all of the basic Keller features. It is heavier and more rugged, designed to accommodate larger and heavier work. Spindle power has been increased to 10 hp. Spindle speeds from 30 to 3600 rpm in 20 steps are provided. The spindle is furnished with either No. 12 B&S or No. 50 MM taper bore. Larger work can be accommodated with the 36-in. horizontal, 22-in. vertical and 12-in. transverse travel, and the increased table working surface to 48 by 30 in.



The new P & W model C Keller machine



P & W Velvetrace milling machine

Heavier work is more rigidly supported in all positions on wider and longer bearing surfaces on all slides. Slides have phenolic-to-metal bearing surfaces. Lead screw nuts are phenolic molded. An automatic one-shot system insures quick, positive and thorough lubrication of all important sliding surfaces. Optional rapid traverse for vertical and horizontal machine movements is available. The model C has been provided with an efficient, automatic chip removal and coolant system.

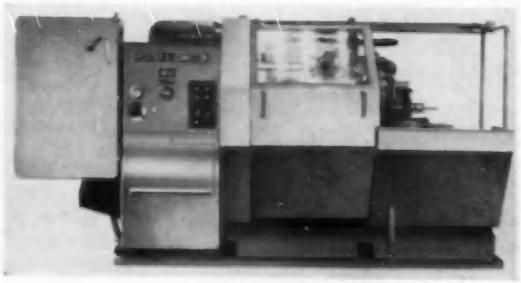
A new duplicator, the Velvetrace milling machine, has spindle speeds of 310 to 10,800 rpm and 12 by 9-in. work capacity. The tracer control system is unique but relatively simple. The tracer point follows the model with extreme accuracy, but without contacting it mechanically. There is said to be no deflection or mechanical motion in the tracer and, therefore, no positional offset or time lag. Control signals are produced instantly and continuously. Inherent error is less than that of the best possible milling tolerances and may be completely disregarded. The system utilizes a high voltage, low current spark gap. The surface of the model is made electrically conductive and grounded to the machine. The slightest variation in the gap produces a proportional change in the voltage across the gap, which is instantly amplified electronically to control the magnetic clutches which drive the spindle quill and the transverse or longitudinal motions of the table. Each drive has a pair of magnetic directional clutches which are always both driving and slipping. Neither ever engages to the extent of not slipping nor disengages to the extent of not driving. The opposed drive provides maximum sensitivity and continuously variable speed control. Each clutch, having its own individual drive to the slide, eliminates the possibility of backlash, resulting in extremely accurate milling. Operation of the machine is completely automatic. The table is set to travel in a series of passes, step-feeding the cross slide at the end of each pass. If desired, the cross slide may be the traversing member, step-feeding the table.

The cutter spindle quill roll-feeds on precision preloaded ball bearings.

A new design die sinker for the drop forging industry, No. 3C, is capable of handling heavy dies within the range of 14 by 24-in. table travel by hand or with a hydraulic duplicator for tracer control operation. General construction is much heavier than present models, giving added strength and rigidity. The hydraulically counterbalanced knee is much wider, and the column and carriage ways are wider. All slide ways are protected by telescoping guards. Table working surface is 15 by 40 in.

Spindle power has been increased to three hp. Power is transmitted through a new timing belt drive.

(*Turn to page* 159, *please*)



Potter & Johnston model 4U automatic turret lathe.

MACHINE TOOL SHOW

BARNES DRILL CO.

Booth 818

Two new drills, a new production honer, and the relatively new electronic hone expansion and Plugmatic sizing devices will be operating.

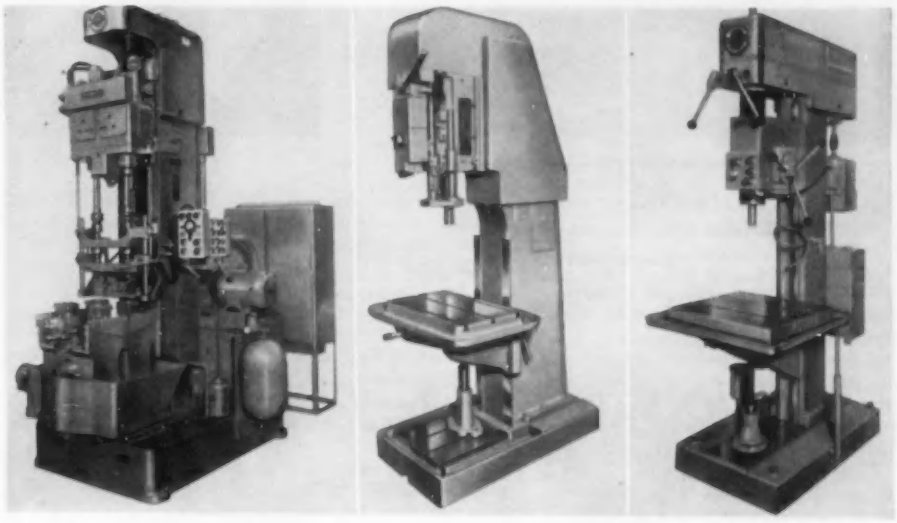
The model 111 honer is being introduced for high precision work on three-in. length. The machine features air-electric hone expansion, Plugmatic bore-to-bore sizing and automatic gaging and ejecting equipment. Bores of transmission gears will be honed on a production basis.

Two rates of feed and rapid approach are features of the new model 64 standard hydraulic drilling machine. It is said to be adaptable to single purpose operations with an automatic cycle. Feed rates range from one to 22 ipm, with rated capacity ¾-in. in steel.

Four models of a ⅞-in. heavy duty drilling machine are being introduced. The one illustrated has a four-speed back geared transmission to provide eight speeds from 251 to 2900 rpm. Other models, a v-belt drive version with speeds from 58 to 4350 rpm, a special-purpose single speed drill, and a tool room model with four-speed motor.

One station of a 19-station transfer machine for an automotive part will be on display. Other equipment to be shown includes the Barnesdril line of magnetic and fabric coolant filters, and honing tools. Electronic hone expansion will be demonstrated on the model 224 honer.

Circle 47 on postcard for more data



Barnesdril model 111 honer, model 64 hydraulic drilling machine, and model 7/8 UB drilling machine.

CARLTON MACHINE TOOL CO.

Booth 919

The new Carlton-Leber speed-feed pre-selector and program systems will be introduced. The two devices offer faster and more economical hole drilling production.

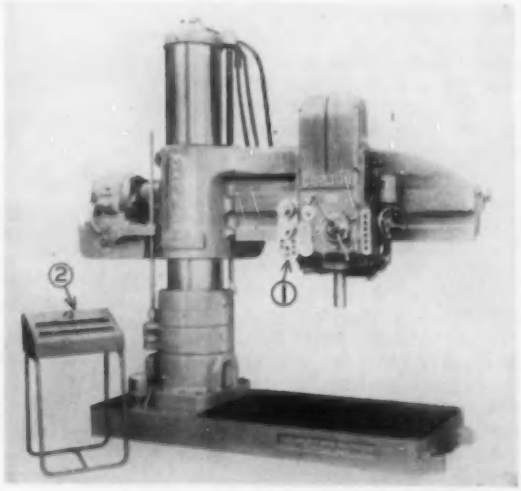
The pre-selector allows operator to select the speed and feed for the next operation while the spindle is under cut. Additional time is saved by instantaneous gear shifting, made possible by mechanically oscillating the change gears which assures quiet gear mesh.

Programming permits advance preselecting of speed and feed for each operation. The unit includes an indexing dial to visually show the operation sequence number being performed.

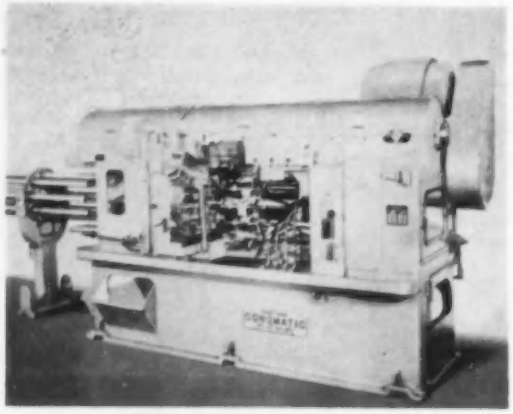
By manually advancing or reversing the indexing dial, operations may be performed out of sequence.

The programming console may be furnished for 20 or 30 operations.

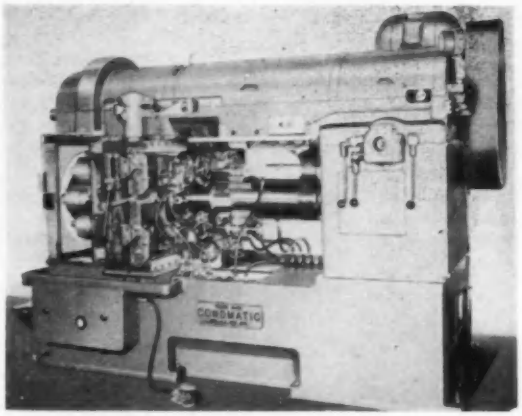
Circle 48 on postcard for more data



Carlton-Leber speed-feed pre-selector (1) and program (2) systems, installed on a Carlton 4A radial drill, offer faster and more economical drilling.



Eight-Spindle Conomatic Chucker VE



Six-spindle Conomatic Chucker TJ

CONE AUTOMATIC MACHINE CO.

Booth 401

Eight machines will be demonstrated—six are bar machines, two are chuckers.

A five in. single spindle conomatic will make a work piece out of B-1113 steel bar stock, of 4¾ in. OD. Carbide tools will be featured. The machine is designed for heavy work.

Of interest will be a 9/16-in. size six spindle Conomatic. The machine marks Cone's entry into a new field of automatic bar machine service. Heretofore, the smallest size machine built by the company has been a ⅞ in. four-spindle. The 9/16 in. six will make a valve seat screw of ⅜ in. hex brass.

Model TF, a 1⅝ in. six spindle bar Conomatic will produce a work piece of non-ferrous bar stock, of 1⅝ in. OD. All outside surface tools are of carbide. Features of this machine are its many quick job change provisions.

Cone's most recent design in the eight spindle line is its model VE, 1⅝ in. The job features heat treating and quenching in one of the eight tooling positions.

A 3½ in. four spindle Conomatic will feature a 100 per cent carbide tool up in making a simulated outer bearing race from 3½ in. OD cold drawn 8620 bar stock. This machine is one of the seven models of Cone's line of quick job change machine, covering four and six spindle machine requirements.

Individualized is the 4-Hi Conomatic. A 1 in. size machine will form, chamfer, and cut off studs from 4 bars of ⅞ in. C-1144 four pieces at a time, held in the four work spindles. A pickoff attachment holds

NATIONAL ACME CO.

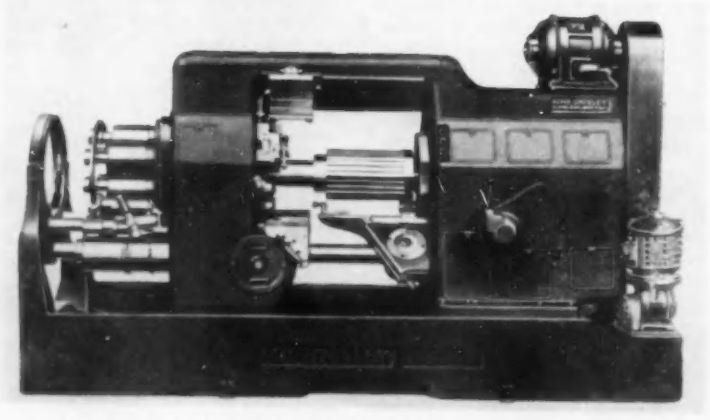
Booths 705, 324

Three of the newest Acme-Gridley automatics will be in action. The four-in. eight-spindle bar automatic is said to be the world's largest-capacity production machine of this type. Using carbide tooling throughout, bearing races will be produced two at a time from 52100 steel tubing at 340 pieces per hour gross production. Standard spindle speed range of the machine is 56 to 464 rpm.

The 1¼ in. eight-spindle model will be producing a spark plug body from B-1113 steel hex stock, performing 16 operations in 4.5 seconds machine cycle time using carbide and high speed steel tools in combination.

The new 4¾-in. model MR single spindle fully automatic bar type turret lathe will perform 15 operations using carbide tooling to complete a finger holder spool from 4620 steel tubing in a machine cycle time of 3 minutes. The new cycle timing drum provides fully automatic control of six predetermined spindle speed changes and three selected feed ranges as well as spindle reversing during the complete machine cycle.

Other machines to be exhibited include a one-in. six-spindle machine with spindle stopping mechanism permitting a cross-drilling operation on a brass part which will also be threaded with a National Acme thread rolling head and tapped in a machine



National Acme 1¼ in. eight-spindle Acme-Gridley automatic bar machine

the pieces for clean cutoff operations by the four cutoff blades.

Two six-spindle Conomatic chuckers that will be demonstrated are the 5⅞ in. and 9¾ in. sizes. The chucks of the former will be hydraulically operated, and those of the latter pneumatically. The work pieces that will be made by these machines are chosen to demonstrate the various Conomatic chuckers.

Circle 49 on postcard for more data

KEMPSMITH MACHINE CO.

Booth 616

First of what will eventually be a complete line of knee type milling machines, No. 2 and No. 3 plain and universal machines in the Master-Mill line will be shown. They are being built with 7½ to 10-hp spindle drive and 1½ to two-hp feed drive motors. The No. 50 NS taper spindle is powered through an 18-speed gear train, over a range of 25 to 1500 rpm.

Kempsmith milling machine features high speed power traverse in all directions, simplicity of control.

The unit features an electrical spindle control which takes the place of couplings or friction clutches. Eighteen feed changes from ⅜ to 45 ipm are provided. Pushbutton start and stop controls are provided on the knee and the column. Power feed controls are grouped on the knee. Large components, from the overarm to the leadscrew, are said to be features.

Circle 51 on postcard for more data

MOTCH & MERRYWEATHER MACHINERY CO.

Booth 606

Completely new, a bed-type production milling machine will be unveiled at the show. An addition to the line, plain and duplex models are offered. On the plain machine, the spindle motor is 25 hp at 1800 rpm. Spindle speeds from 25 to 1230 rpm are obtained through change gears, with four speeds per set. Table feeds are one to 81 ipm through change gears. Rapid traverse of table is 242 ipm.

There is an involute spline on the spindle for efficient power transmission to the spindle regardless of quill position. The quill diameter is 8¼ in. with a total adjustment of six in. When the quill is fully extended, there is more quill remaining in the housing than is extended. An electric brake clutch is mounted on the input shaft for automatic spindle stop. This also serves as a spindle lock for easy tool removal. As an extra, automatic quill retraction, re-setting, and locking can be supplied.

The gear train is completely enclosed. Anti-friction tapered roller bearings are used throughout the spindle drive. Heat-treated alloy precision steel gears and shafts deliver long life. Helical change gears give smooth and quiet power transmission. Spindle speeds with 50:1 ratio for a total of 82 spindle speeds afford proper selection of spindle speed for all types of materials and cutters. The counter-weighted milling head has an alloyed iron overarm arbor support with locks, which lends rigidity to the cutters. Rigid overarm brace and arbor support insure arbor accuracy.

Construction of the bed is ribbed reinforced alloy iron with large coolant and chip compartments. The table has standard T-slots and the ways have non-metallic liners with special lubrication and way wipers. The hardened and ground table screw operates in a split nut which has an external back-lash adjustment to achieve smoothness of table feed and traverse. Table construction is for heavy duty operation with ground dovetail ways, gibbed and located on the spindle side for greater accuracy and assurance of smooth climb milling. The feed box and table drive mechanisms have automatic force feed lubrication. Central type coolant and chip disposal systems can be used.

The No. 2-8-A circular sawing machine is being introduced to industry. This machine combines the latest improvements and latest innovations for cutting of machinable metals. The capacity of the 2-8 is up to eight in. round or square. All solid and structural shaped metals can be cut. All control mechanisms are located at the front of the machine. Six spindle speeds by gear change made by a dial in the saw head indicate the concern of the builder for reducing the set-up time and increasing the convenience, speed, and safety of operation for the user. The drive is by enveloping worm to helical pinion and spindle gear with special provision for back-lash take-up.

Circle 52 on postcard for more data

cycle time of 1.78 seconds; 5¼-in. six-spindle hydraulic chucking automatic using combined carbide and high speed tooling to produce a housing cap from bronze casting in a machine cycle time of 13 seconds; an eight-in. eight-spindle hydraulic chucking automatic arranged with double indexing to complete both ends of a cylindrical iron pulley, and several others in the line.

The complete line of threading tools also will be shown, including Vers-o-tool self-opening heads for threading and hollow milling, revolving and non-revolving collapsible taps, self-opening thread rolling heads for revolving and non-revolving type machines, and the hydraulically operated thread rolling machine. Other exhibits will demonstrate products of the Electrical Manufacturing Div., including the heavy duty Snap-Lock limit switches, control station and motor starter switches, a line of light contact limit switches, and Namco solenoids in standard and special designs.

Circle 50 on postcard for more data

MOLINE TOOL CO.

Booth 1304

Model HU110 vertical, single column, hydraulic feed, universal joint type drilling machine will be exhibited. The spindle drive unit contains 24 spindle drivers, each with individual, two-speed-and-neutral adjustment. The main drive is provided with a two-speed-and-neutral adjustment, superimposed on the individual spindle driver speed selection. Pick-off gears are available to permit changing the over-all speed range. Gearing in this 24-spindle unit is so designed that the full power of the driving motor can be taken through either the right or left group of 12 spindles without overloading. Sliding spline drive between power unit and spindle drive gears has been eliminated. The entire spindle drive unit together with spindles is applicable for vertical or horizontal drilling or at any angle.

Total hydraulic travel is 18 in. Drilling area is 15 by 24 in. Machine capacity is 20½ in. dia. drills in cast iron or equivalent load.

Model HD67 straight line type drilling machine, with hydraulic rail feed is equipped with eight spindles which can be adjusted along the machine rail for various center distances. The maximum center distance between the two spindles at each end of the line can be set at six ft and the minimum center distance between adjacent spindles is 2½ in. Spindle speeds may be changed by means of a four-speed change gear box. If a higher or lower range of spindle speeds is desired, interchangeable pick-off type gears are included. Rated capacity of each spindle is 1⅞ in. diameter drill in mild steel. Spindle units of larger or smaller capacity, having various minimum center distances between adjacent spindles, are available for this machine. Total rated capacity of machine is 32⅝ in. diameter drills in mild steel or equivalent load.

Various representative spindle units will be displayed which can be used on Moline machines. One is a recent development for application on multiple spindle machines for drilling tube sheets or header plates used in heat transfer equipment.

Circle 53 on postcard for more data

HEALD MACHINE CO.

Booth 902

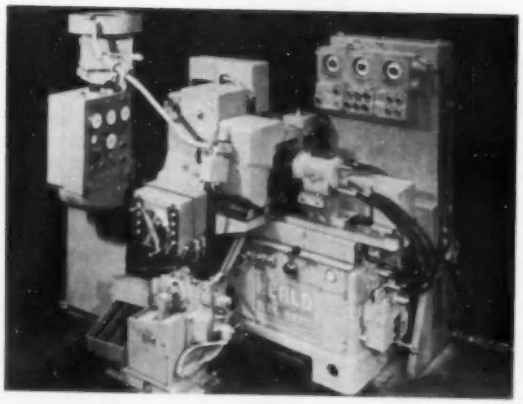
Three new and completely automatic high production internal grinding machines, the models 190 Centri-Matic bore grinding machine, 1901 Centri-Matic ball track internal grinding machine and 170 automatic chucking internal grinding machine will be demonstrated.

All three employ self-adjusting grinding cycles through a feedback system. Wheel change at periodic intervals is the only attention these machines require; for this the machines shut down automatically and flash attention lights.

The model 190 will be in production on inner ball bearing races. Parts are located and rotated on the ball track, using hard shoes, eliminating the necessity of grinding the lands on many applications. Rotation is by frictional engagement with a rotating backing plate. A new rotary diamond with self-compensating cycle eliminates diamond adjustments and maintains a uniform wheel dress at all times. Other new features include air after gaging, sorting and feedback.

The model 1901 Centri-Matic is in production finishing the ball tracks on outer races with a self-adjusting Size-Matic cycle. Air gaging is employed in the unloading chute which feeds back intelligence to the radius dresser, compensating for trends toward the high and low points within size tolerances. Skip dressing and compensation is featured on this machine.

The model 170 is an end loading automatic chucking machine, employing feedback to a Size-Matic cycle. An interrupted blind hole in automotive valve tappet bodies is the part in production at the show. Hopper feed with automatic orientation of the part is employed. Feedback to a new rotary diamond is initiated by air gaging in the unloading chute which also sorts parts, should an outsize bore be found.

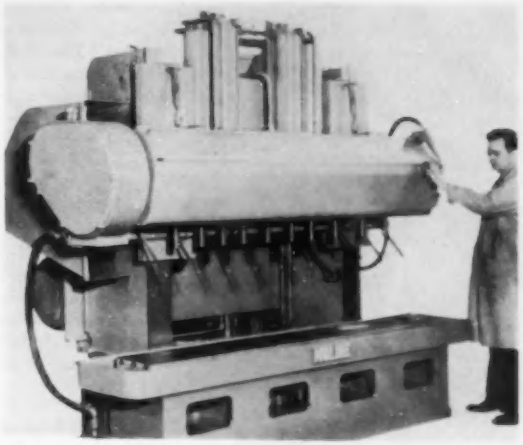


Heald model S vertical Bore-Matic

The model S vertical Bore-Matic will be shown for the first time. The vertical and horizontal slides traverse on hardened steel box-type ways which are force feed lubricated. Vertical or angular as well as horizontal slide unit mountings are made possible because the table is gibbed down to the under side of the hardened ways.

The vertical base itself is a weldment on which one or more slides may be mounted vertically in the following ways: A single slide approaching a single work station from above; two slides approaching two work stations from above; two slides, one approaching the work station from above and the other from below; four slides, two approaching two work stations from above and two from below. Horizontal and angularly positioned slides may also be employed.

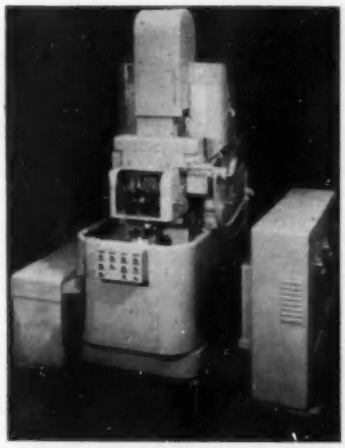
In order to demonstrate the adaptability of the new model S Bore-Matics to fully automated, continuous flow production line setups, a sample segment of a complete automated piston line will be shown. Operations include finish boring and elliptical box turning with fully auto-



Moline No. HD67 — six-ft. hydraulic rail feed, straight - line driller

matic conveying, orienting, loading and unloading, flushing and gaging. The setup consists of two individual machines, placed side by side and connected by a conveyor belt.

Two new models of vertical column rotary surface grinding machines, models 161 with six-in. chuck, and



Heald model 170 automatic chucking machine for internal grinding

361 with 24-in. chuck are announced. The model 161 is furnished with manual or mechanical type power table reciprocation. It has a 10-in. vertical capacity from top of chuck to center of grinding wheel and the chuck can be swiveled 15 deg for convex or concave grinding. Grinding stroke is four in.; swing inside the chuck guard is 12-½ in. The permanently lubricated wheel spindle has a built in 1-½ hp motor and operates with the same smoothness typical of Heald precision Red Head wheelheads and boringheads.

The big model 361 24 in. chuck machine is similar, but has the construction and power, essential for big work or heavy stock removal. A double pump system on this hydraulic model assures a cool cutting wheel. The model 361 is furnished with plain or automatic cycles, both types being equipped with power vertical feed and power vertical traverse for the wheelslide in addition to the hydraulic table drive. A sparkout attachment is available for the automatic machine providing automatic control of sparkout time. Swing inside the chuck guard is 28 in. and vertical capacity is 17-½ in. maximum from top of chuck to center of wheel.

Two horizontal, cam-actuated Bore-Matics and a redesigned vertical spindle, cam-actuated Bore-Matic will be shown for the first time. The horizontal machines, models 2215 and 3215 are identical except for size and capacity. They are constructed with rigid base and hardened steel box type ways. The scraped table ways are pressure lubricated. A hydraulic gib not only maintains accurate alignment, but functions as a take-up for wear.

In cycle, the table is advanced to the cam under air pressure at which point the cam controls the cycle. Although primarily intended for continuous high production of a single part, removal of four screws permits the entire cam unit to swing out from the base of the machine for changeover.

Cycle speeds may be changed within wide limits by changing sheaves, belts and gear ratio. Any combination of straight, taper or contour boring, turning, facing or grooving operations may be performed. Rapid traverse stroke is 10 in. on the 2215 and 13 in. on the 3215, providing capacity for loading relatively large work. Boring stroke is four in.; cross slide stroke three in.

The vertical spindle line consists of machines with up to four stations for facing, chamfering and grooving operations, although boring and turning may be included.

Circle 54 on postcard for more data

BARDONS & OLIVER

Booth 325

Among the machines to be exhibited will be a No. 4 universal turret lathe. Headstock controls as well as those for certain other functions have been regrouped to decrease the physical effort of the operator.

The headstock features 16 spindle speeds in a wider overall range. The slight motion of one small handle automatically controls electric clutches as well as the speed changing. Speeds are preselected and correct cutting speeds determined by a large dial. Three speed ranges and more powerful motors are also featured, for carbide tooling. Twelve feed changes are provided to the turret slide and carriage, indicated on large dials. Feed changes in each apron are made with a single lever.

A completely new hydraulic collet chuck and bar feed features faster operation, stronger grip, and greater ease of control. After a length of bar stock is inserted, no further handling is required until another length is needed.

Another machine being shown is a No. 21 saddle type turret lathe featuring higher spindle speeds and higher horsepower motor. A new full swing cross slide and carriage is being featured with increased swing. Both cross and longitudinal rapid traverse are provided. Feeds are easily changed by single lever control and indicated on large feed dials. Other turret lathes include a new No. 3 universal turret lathe providing higher spindle speeds, and a No. 1 geared electric turret lathe with Autocycling features.

Circle 55 on postcard for more data

Barnes Electro-Graphic Detector System, in which key points in control circuits are brought out to colored lights and a diagrammed test board.

W. F. & JOHN BARNES CO.

Booth 1223

Latest developments in machine design applied to the complete machining of an automobile cylinder head will be the main feature of this exhibit. A scale model of a complete plant layout and equipment will show the latest developments in hydraulics, electrical controls, and mechanical work handling units. The model will also illustrate how automatic storage conveyors may be profitably applied in an automatic production setup.

Other portions of the exhibit will feature a five-station operating section of a 26-station automatic Progress-Thru transfer machine built to handle certain automobile cylinder head operations. This unit will be a full-size machine completely equipped with the latest in electrical controls and hydraulic circuits. The electrical controls will feature the Electro-Graphic Maintenance Detector System. This entirely new electrical system, announced earlier this year, will be fully demonstrated.

Circle 56 on postcard for more data

DANLY MACHINE SPECIALTIES, INC.

Booth 1302

Focal point of the exhibit will be a 100-ton capacity Autofeed press in operation. This heavy-duty two point geared eccentric shaft drive press will demonstrate its capacity for high-speed stamping, under actual production conditions, with progressive dies. A new coil cradle, automatic feed device and scrap cutter will be operated with this press.

The exhibit will also feature a complete representative selection of other equipment. Other presses on display are a 200-ton capacity single action straight side press and a 400-ton capacity double action straight side press. The hydraulic equipment section will include portable piercing and riveting units and a working model of the Danly square body cylinder. Press accessories will also be exhibited: rotary cam limit switch, oil pressure safety switch, air control manifold and dual air valve.

A special portion of the exhibit will be devoted to a demonstration of the air-cooled, air-operated press clutch and brake.

An added attraction will be a daily tour through Danly's Chicago plant.

Circle 57 on postcard for more data

GEAR GRINDING MACHINE CO.

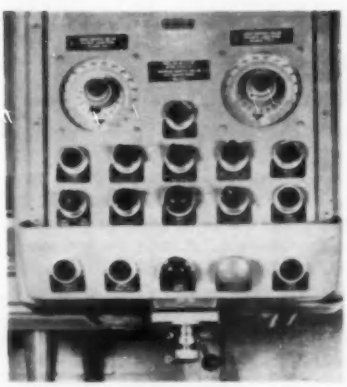
Booth 315

The following machines will be on display and shown in operation:

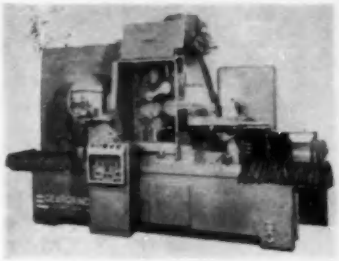
The fully automatic gear grinding machine (GG-10X24FA), specially suited for high production needs. Among special features are single or double diamond trimmers to assure perfect blend between tooth profile and root fillet and coolant through the grinding wheel controlling flow of cooling and lubricating fluid.

The fully automatic gear grinding machine (GG-1024FA) master control panel which features a transparent cover which prevents the operator from accidentally changing the adjustment. The panel may be locked, thus avoiding change by unauthorized personnel. Controls needed by the operator are in the open at top of panel.

The new Detroit Screwmatic 750—single spindle automatic screw machine—will be demonstrated to show how advanced design offers: infinitely variable spindle speeds and three different forward speeds during



GGM master control panel

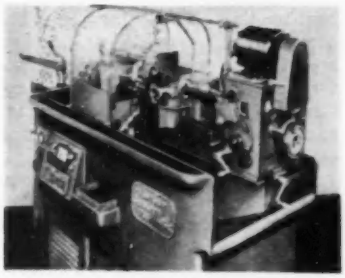


Gear Grinding Machine No. GG-10X24FA

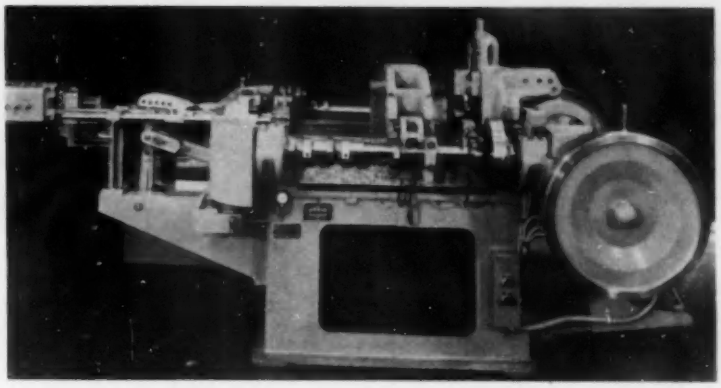
any cycle of work; the elimination of left hand tools—all speeds are reversible; greater work length capacity; assurance of precision work due to heavy section cross slides and direct cam activation; increased set-up speeds.

In addition to the above, the spline grinding machine, SG-10X24FAL will be demonstrated. This machine is a fully automatic, high production flute or spline form grinder.

Circle 58 on postcard for more data



Detroit Screwmatic 750 single spindle machine



U. S. Tool Multi-Slide No. 33

U.S. TOOL CO.

Booth 215

The Multi-Slide automatic machine for the production of stampings from coil stock, combines all of the operations, usually performed by several presses. The machine will pierce, blank, form, swage, emboss and assemble.

One operator can handle a battery of machines, with no more attention than supplying stock. New is the incorporation of a tapping unit on the machine, thus eliminating the necessity for a secondary tapping operation.

An MM-1-D Multi-Miller for milling operations on small parts, requiring extreme accuracy and intricate cuts will also be shown.

Circle 59 on postcard for more data

BROWN & SHARPE MFG. CO.

Booth 520

Among the machines and equipment which have just recently been announced, or will be introduced at the show, will be the following:

No. 00 and No. 4 automatic and No. 2 hand screw machines.

Rangemaster No. 20 universal milling machine, No. 0 Omniversal, No. 000 and No. 12 plain milling machines.

No. 11 face, No. 2L surface and No. 13 universal and tool grinding machines.

Measuring tools and gages, electronic measuring equipment, milling cutters, screw machine tools and pumps.

Circle 60 on postcard for more data

CLEVELAND AUTOMATIC MACHINE CO.

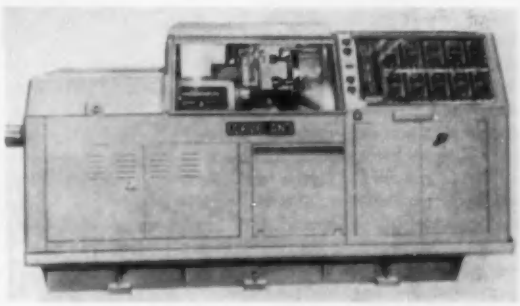
Booth 412

Three Cleveland single spindle automatics, will be under power and producing four different parts made from three different materials. The three-in. model AB Dialmatic is essentially a bar machine, but can be furnished with a simple chucking attachment which quickly converts it to a chucker. It will be equipped with one of these chucking attachments and producing a part from a meehanite casting.

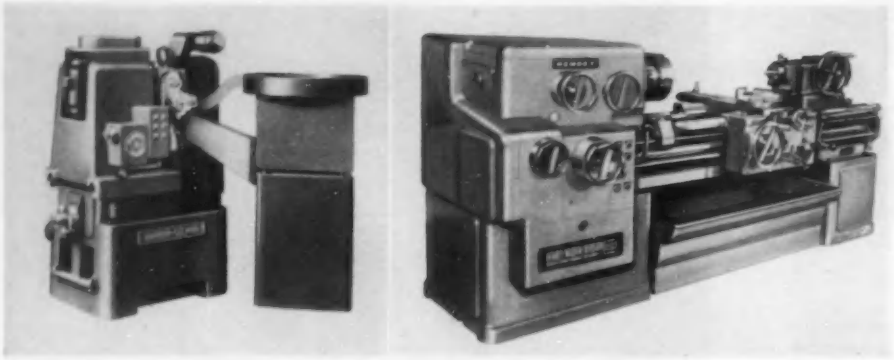
Another will be the 2½ in. Model AW single spindle automatic. It will be set up as a bar machine producing a part from free machining brass.

The third machine is an entirely new single spindle automatic. It will be a 1⅝ in. Model AB Dialmatic, but the same machine will also be offered in 1⅝ in. capacity. This machine is equipped with electric feed drive which provides separate, infinitely adjustable feeds both forward and return for each of the five turret positions. No cam changes are necessary to adjust the feeds of the turret tools. After spindle speeds and feeds for each station have been determined, a chart conveniently located on the control panel, quickly transposes these feeds into dial settings.

Circle 61 on postcard for more data



Model AB Cleveland Dialmatic.



Barber-Colman No. 3-6 vertical hobbing machine and Hendy 16-in., 32-speed geared head lathe.

BARBER-COLMAN CO.

Booths 221, 1322

The No. 3-6 vertical hobbing machine to be introduced at Booth 1322 is designed specifically for automatic loading and automatic gaging of parts which are mass produced. This machine has standard basic elements, but the tooling, loading, gaging and handling are designed to suit the requirements of each part. It is designed for continuous operation on gears up to three in. diameter by six in. face width. Pitch capacity is 10 DP. Although it is a single-purpose machine, it is possible to change the tooling to cut another part.

The machine shown has a vibratory hopper loading device, and the gaging mechanism segregates gears of the correct size from those that are undersize or oversize. If a pre-determined percentage of gears are out of tolerance, the machine can be made to stop automatically. Size inspection is made by measuring over balls.

Other types of loading and gaging also are available. Loading can be by conveyor or magazine when required. The gaging unit can be furnished to inspect almost any elements of the gear. The automatic hob shifter is also a part of the cycling mechanism. It can be set to shift a certain amount after each cycle, or it can be arranged to shift after a certain number of parts have been cut. Shifting increments are conveniently changed by turning a graduated dial. The hob slide is clamped pneumatically.

The hob is set to the proper depth by means of a centerdistance adjusting mechanism. The hob is set in a fixture so that the indicator finger touches the outside diameter, and the indicator is calibrated to read directly the centerdistance between the work and the hob. Hobs are designed with a minimum diameter to increase the indexing speed for a given surface speed. Hobs are also longer than standard to reduce hob changes.

Index and fees change gear mountings are fixed. However, to compensate for small lead changes due to heat-treating distortion, a tangent bar arrangement is attached to the feed screw nut to provide small lead corrections. The hob swivel can be rotated 45 deg either side of center to accommodate any changes in hob design.

Both the work and hob spindles are mounted on precision tapered roller bearings. There are three separate lubricating systems. Drive for the main motor is through a timing belt;

CINCINNATI SHAPER CO.

Booth 1105

Latest development in the line of shapers is a 42 in. model with a steel frame, welded and stress relieved. It features a triangular ram, hooded for stiffness, and a steel table and rail. The operator can select from 16 cutting speeds while the ram is in motion, from 25 to 400 fpm. He also has lever control on either side of the machine.

Drive is through a full helical constant mesh transmission with hydraulically operated clutches. Energy is said to be recovered on the reverse stroke, to relieve the clutch load. Features of construction include a Nitralloy steel drive screw and hard bronze nut, pressure lubrication and control from 150 psi system, phenolic ways, and five angular feeds.

Cincinnati Shaper 42-in. model, left, and 16-in. model, right.

A new series of shapers will be introduced, represented by a 16 in. heavy-duty model illustrated. This new series features a nodular iron slot-free ram, vice body and trunnion. It has a brushless electro-magnetic brake and clutch, 50 psi pressure lubrication, improved wide support on plain table models, and automatic tool lifter.

Press brakes and shears in large sizes also will be demonstrated for the first time.

Circle 62 on postcard for more data

JIC electrical recommendations are followed throughout.

The Hendey 32-speed geared-head lathe to be shown at booth 221 is a completely new lathe designed specifically for high-speed precision production and maximum ease of operation. It features a belt drive for the top eight speeds. The belt drive assures smoother finish and quieter operation at the high speeds where power is not a primary requirement. The 24 lower speeds are obtained through a geared drive to produce maximum power for heavy cuts. The 32 speeds are in geometric progression.

This lathe can be furnished with maximum spindle speeds of 1000, 1500 or 2000 rpm. The motors recommended for these maximum speeds are 10, 15 and 20 hp respectively. Positive braking of the spindle is provided. The hardened and ground headstock spindle is mounted on precision antifriction bearings with a center bearing support. Two dial-type handwheels, located at the front of the headstock, mechanically actuate the entire 32 speed changes.

The tailstock is equipped with a two-speed spindle. The lathe is available in a 16 in. rated size with 18½ in. swing over the ways. Other features include an independent lead screw, automatic filtered lubrication to all moving parts, special high-speed reversing unit, precision automatic stops, and induction hardened and precision ground bedways.

Circle 63 on postcard for more data

RACINE HYDRAULICS & MACHINERY, INC.

Booth 102

A full line of metal cutting power hack saws to be shown includes a new model 816 hydraulic utility saw with an 8 by 16 in. capacity. It combines the important features of wide utility and large capacity, available with two-speed or four-speed drive.

Other products to be shown are a model W-3B three-speed 6 by 6 in. capacity utility machine; model 6-C fully automatic heavy duty machine; model 60-C with hydraulic chuck 10 by 10 in. capacity general duty machine; and model 30-C with hydraulic chuck heavy duty machine. All machines offer pivoted arm construction, affording front or side loading. Each is easily adaptable to special fixtures.

Circle 64 on postcard for more data

Kent-Owens No. 3-36 hydraulic milling machine

KENT-OWENS MACHINE CO.

Booth 1218

Introduction of the No. 3-36 hydraulic milling machine will be made. It is designed for rapid milling operations on larger size work with a 7½ or 10 hp drive through the spindle. A speed range of 20 to 1050 rpm is provided.

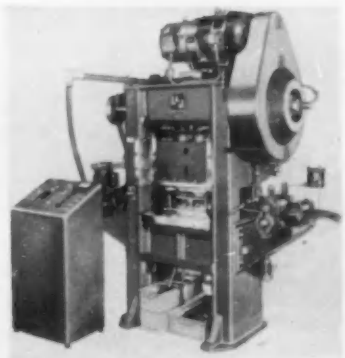
Heavy bed type construction, twin post head mounting on ground cylindrical posts, and two gear contacts in the spindle drive are key features. The table with heavy rib sections, takes its bearing on the hardened steel ways. Lubrication of the table gears is automatic. The table has a rapid traverse rate of 300 ipm, and may be fed from ½ to 60 ipm. Separate rate controls are provided for independent feed travel in either direction. Attachments to give extremely accurate depth milling with positive stop and dwell, either in one or two directions, and automatic spindle stop are also offered.

Circle 65 on postcard for more data

L & J PRESS CORP.

Booth 407

The No. 20-2-24 double crank, straight side, high speed press, 20 ton capacity, will be shown for the first time. It will be operated with a progressive die for large volume production of small precision electronic parts This press has a maximum speed of 450 strokes per minute. Equipment includes air clutch with controls for inching, single stroke and continuous running; adjustable rotary limit switch; air release spring set brake; push button speed controls; flood oil lubrication system with pressure controlled switch; thermal limit switches in all crank shaft bearings; microswitch in die interlocked with clutch control; double roll feed; by-pass type roll lifter; scrap shear and stock oiler.



L&J No. 20-2-24 double crank straight side high speed press.

An open back inclinable punch press, geared model No. 5 of 56 ton capacity is built in both geared and non-geared models. New frame design provides more rigidity in stress areas to minimize deflection under heavy loads. The model exhibited will be equipped with air clutch. No. 6 open back inclinable punch press is available in geared and non-geared models with 65 ton capacity. Features include large work area, extra sturdy frame, long adjustable gibs, replaceable hard bronze seat in lower ram for adjusting screw etc. Also available with air clutch.

Circle 66 on postcard for more data

MATTISON MACHINE WORKS

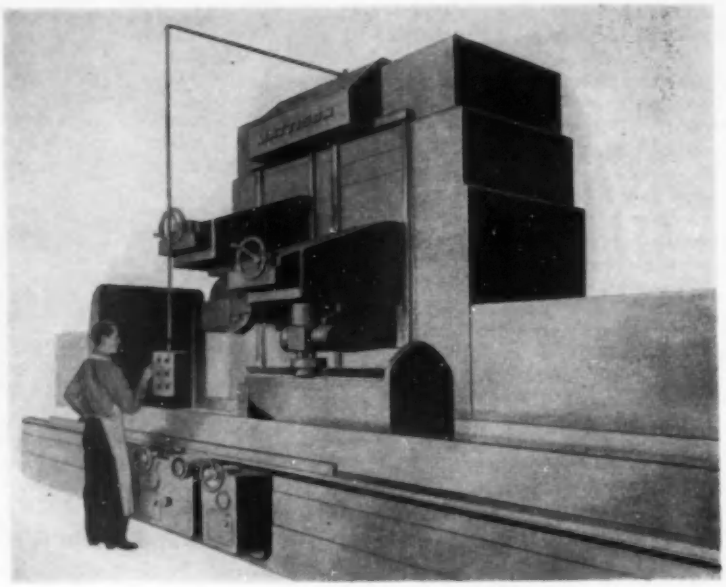
Booth 1422

A combination way and surface grinder which features independent vertical and horizontal spindle slides will be demonstrated for the first time. It was designed to grind large bed castings, columns, tables, slides, saddles, and heads to precision tolerances, without re-handling. It will grind V and flat ways, dovetails, shoulders, edges, radii, and contours in a single setup. Independent vertical and horizontal spindles permit holding two or more surfaces in exact relative alignment. The heads are counterbalanced to permit maximum accuracy and simplify operation.

The machine can be furnished with one vertical and one horizontal spindle, with two vertical spindles, or two horizontal spindles. One may be completely withdrawn from the operational area during the machining process. The vertical spindle is designed with 45 deg swivel forward or back, operated by a worm and crank. Two-speed power traverse is provided for rapid positioning, with a hand wheel to make the final fine adjustments.

Lubrication of the machine is fully automatic with a centralized lubricating system doing the job wherever oil is required. Any parts that cannot be oiled are packed with grease. The ways are belt-covered and fully lubricated by the automatic lubrication system. The entire hydraulic system has been isolated at the back of the machine in order to prevent vibration and heat distortion. An all-hydraulic wheel dresser has been developed as standard equipment on the vertical spindle. It is mounted over the face at the end of the casting and is adjustable from 30 to 60 deg.

Three large heavy columns are reinforced at the top by two well-supported, connecting braces thus making the column support unit an integral part of the base. Columns can be furnished with hardened steel dovetail ways or Meehanite. The machine will be manufactured in a range of sizes from 30 in. width by 30 in. height by eight ft length to 42 in. width by 48 in. height by 24 ft length.



Mattison combination way and surface grinder.

Circle 67 on postcard for more data

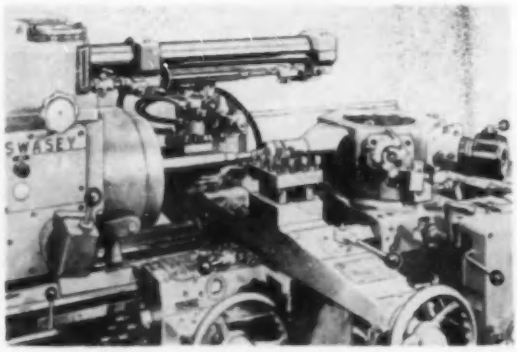
WARNER & SWASEY CO.

Booth 717

Among new items shown will be a hydraulic contour tracing attachment for contour turning and facing work, and a bar turner for stepped shafts.

Using either flat or round templates as the master pattern, the new hydraulic tracer provides accurate control of both rough and finish cuts. It is mounted at a 45 deg angle on the rear of the cross slide of the particular turret lathe and is intended for operation with the machine spindle rotating in the reverse direction. Reverse rotation of the spindle causes the cutting pressure to be concentrated downward into the cross slide and rear bedway, thus obtaining greater rigidity and accuracy.

Actuation is through the use of a large hydraulic cylinder powered by a separate hydraulic pump unit, providing a maximum effective cutter travel of four in. The 45 deg angle of the contouring slide permits the machining of contours, tapers and stepped diameters that increase in the direction of trace, up to and including 90 deg shoulders. A differential type hydraulic system is regulated by a precision-built stylus control valve. The tracer stylus itself, which actuates the control valve, utilized a flexure type pivot to eliminate any lost motion or play. Flat templates are mounted in a long clamping bar attached with brackets



W & S hydraulic contour tracing attachment, installed on 2A extra heavy duty saddle type turret lathe which is operating in the reverse direction. It controls up to four rough cuts and one finish cut.

MACHINE TOOL SHOW

to the overhead pilot bar of the unit. Micrometer adjusting screws permit accurate alignment of the template with the spindle axis. Center adapters, which can be inserted into the mounting bracket in place of the flat template holder, are used to hold turned patterns. The tracer will be demonstrated on both 2-A saddle type and No. 5 ram type turret lathes.

The bar turner for stepped shafts, called the Progressive Step Turner, uses but one cutter. Limited in cutting length only by the ram travel of the particular turret lathe, the attachment permits up to five different diameters to be preselected and turned in a range from 1/16 to 1½ in. It is designed specifically for turning a variety of stepped shafts in small lots. It also can be utilized as an easily set-up single cutter turner, which when set to trip at the end of the cutting stroke eliminates tool withdrawal marks.

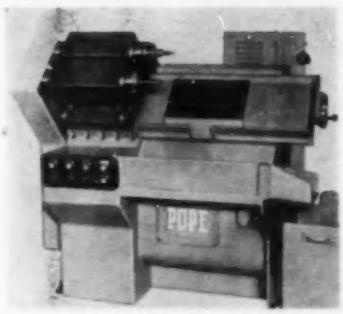
A cutter holder is mounted on a pendulum-like arm suspended from a large shaft equipped with roller bearings. Movement of the arm is controlled through a reduction gear, rack and pinion arrangement by means of four preset micrometer dials located at the top of the attachment. When the first four diameters have been selected on the micrometer dials, the fifth diameter is obtained by means of a stop screw located at the end of the lower rack. Operation of the Progressive Step Turner will be demonstrated on a No. 3 ram type turret lathe.

Circle 68 on postcard for more data

POPE MACHINERY CORP.

Booth 117

The new R-2 super-precision boring machine offers a number of features of interest. A multi-spindle, single end machine of nine-in. table stroke, it combines electrical control and mechanical-rotating operation to achieve simplicity and versatility. It involves no cams, change gears, sprockets, or linkages, yet provides infinitely variable feed and traverse rates. The automatic operating cycle includes a timed loading period when desired.



Pope R-2 precision boring machine.

The table actuating mechanism consists of rotating elements. The electrical control system is housed in a cabinet, permitting easy access.

Table and bridge are set at an angle of 45 deg to allow for rapid loading and unloading and free flow of coolant and chips. The table bearing surfaces are hard chrome plated. Stationary or table ways are never uncovered.

The display will include a 15-hp totally enclosed fan-cooled motorized grinding spindle, mounted and operating under normal plant conditions. A 54,000-rpm high-cycle, totally enclosed water cooled, oil mist lubricated, motorized spindle will also be demonstrated, mounted and with all necessary operating equipment in one unit.

Still another spindle operating exhibit will be the high precision, heavy duty boring spindles, mounted on the new Pope boring machine, demonstrating a unique bearing arrangement.

Also shown will be a motorized, cartridge type one-hp 3600-rpm, totally enclosed non-ventilated dual voltage, three-phase grinding spindle with a section of the cartridge cut away to show the bearing arrangement, and a variety of additional spindles.

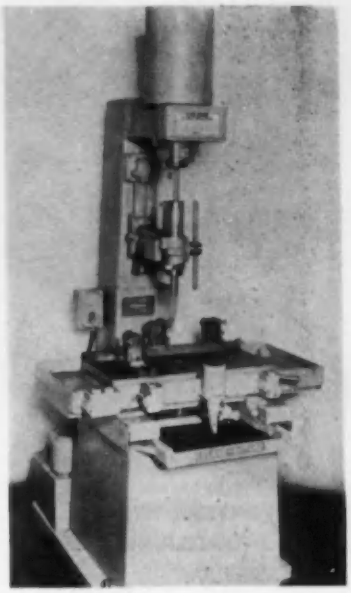
Circle 69 on postcard for more data

LELAND-GIFFORD CO.

Booth 321

A new drilling machine, employing an entirely new system for locating and drilling holes without jigs or fixtures or laying out individual work pieces, will be displayed. It is especially adaptable for producing experimental or replacement parts in small or production quantities.

The so-called Hole Locator will perform all standard drilling operations of No. 2 and 3 drilling machines, including reaming, spot facing, counterboring, etc. It has a movable work table equipped with dual locks released by push-button operated solenoids. The table glides on ball bearings, rolling on hardened and ground rods and may be released to move forward, backward or sideways with compound motion. Movement range is 10 in front to back and 15 side to side. Working surface is 14 by 28 in.

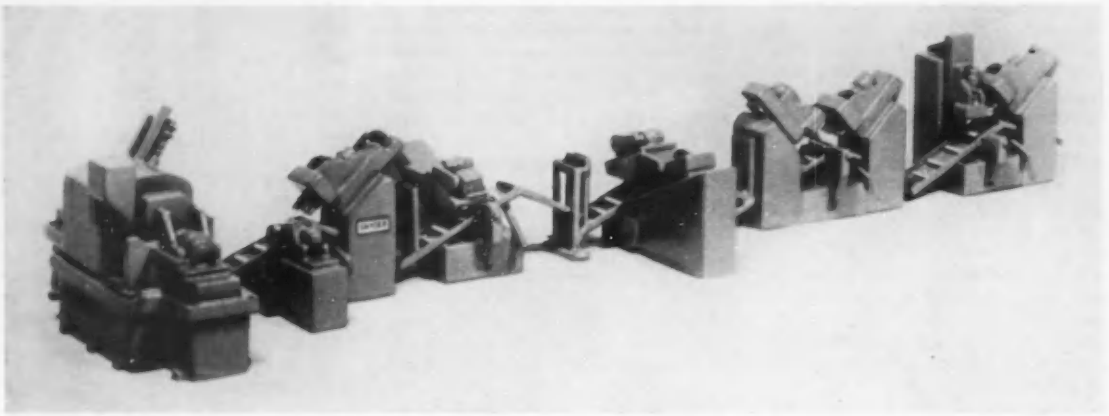


Leland-Gifford Hole Locator

An optical viewer, having 20 × magnification and double cross hairs, is mounted at the center of the forward edge of the table over a layout chart holder. This is registered in relation to the machine spindle by dowel pins on the plate holder. Layout charts supplied with the machine are thin sheet metal plates, treated for scribing. A simplified layout, made directly from blueprint dimensions, is scribed on the chart, using conventional layout tools. Only short intersecting lines are used to mark hole locations; no outlines or other details are needed.

If the work is dimensioned from two edges, the piece is placed against locating strips at the back and left sides of the table and clamped, using three quick-acting hold-down assemblies. Adjustable supports are also furnished for work with irregular surfaces or for through hole drilling. Holes are quickly located by moving the table to bring the scribed lines on the layout chart between the cross hairs in the viewer. The operator drills the hole immediately and adjusts the table to register from the first hole to subsequent holes. Work involving one or more previously cast or bored holes is positioned by using a cone center in the spindle.

Circle 70 on postcard for more data



Model of Snyder fully segmented transfer machine.

SNYDER TOOL & ENGINEERING CO.

Booth 1222

Wheel of Automation is the name given to a display having precision-detailed scale models of ten different types of huge modern automation machine tools.

The highlight will be a model of previously unannounced transfer machine for automotive engine rocker arm shafts, featuring fully segmented automation. This new machine, which will be delivered before the September show, carries to higher automation refinement a partially segmented machine announced earlier this year. The eight-station, 53-ft long segmented machine is made up of a series of six individual machines; each have individual control panels and are individually loaded with conveyors and hopper feeds. This design contrasts with the earlier 75-station, 110-ft long partially segmented transfer machine which had a single transfer bar for the entire machine.

Each operation on the transfer machine can be individually loaded, operated and controlled. Thus, with pre-conditioned stock at various points along the machine, it is possible to keep up production output when certain areas of the machine are shut down for maintenance or tool change.

Other automation machines which will be shown as scale models on the moving automation wheel in the Snyder Tool exhibit, include a 22-station machine for automotive engine cylinder front covers, a 23-station transfer machine for an automotive intake manifold, a seven-station transfer machine for a 155-mm shell, a six-station center column machine for an automotive transmission rear gearing retainer, a seven-station trunnion index machine for an automotive crankshaft, a six-station rotary index machine for an automotive exhaust manifold, a boring and facing machine for a diesel oil pan, a hydraulic vertical railroad car wheel boring machine and a connecting rod balancing machine.

Eleven other Snyder automation machine tools will be shown as translites in the booth.

Circle 71 on postcard for more data

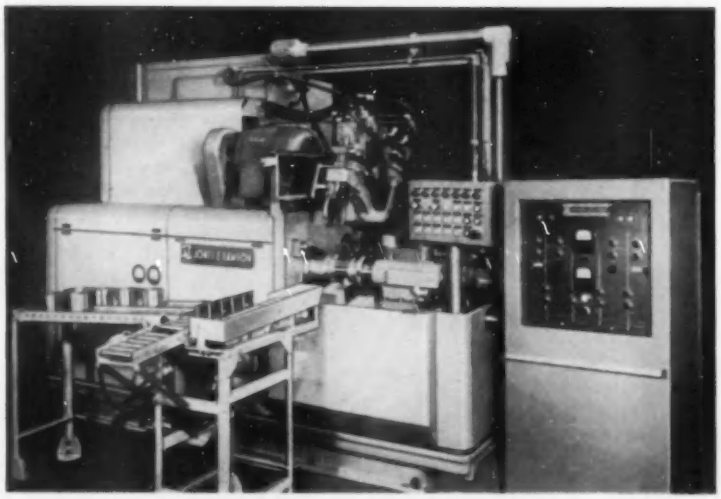
JONES & LAMSON MACHINE CO.

Booth 1111

Eight turret lathes, including one with numerical tape control, will be features of this exhibit. Model 7A-2½ saddle type will be operated by information taken from punched tape, following drawing specifications. Tools are preset to gages. A tape for any part is punched and tools are set; the part is made without further tool adjustment.

Four other saddle type machines will be in operation, showing such features as automatic spindle speed changes, hydraulically operated collet, and two-way hydraulic tracing. Three ram type machines also will be operating.

Fay automatics will feature automatic feedback control including automatic handling, chip disposal, gaging,



J&L Fay automatic with feedback control

MACHINE TOOL SHOW

sorting and tool adjustment. The feed back-control model anticipates the process going outside the allowed limits and starts correction before making scrap. A sequentially controlled tracer model, and Faymatic lathes with swinging back arm and slide type back arm will be introduced.

Various grinders have a number of automatic features. They include form, contour surface, groove, tap and thread grinders featuring high rates of stock removal.

Optical comparators in three screen sizes will be inspecting form tools, firing pins, bevel gear blanks, templates, and various other items. A new model will have multi-lens turrets.

Circle 72 on postcard for more data

F. E. ANDERSON OIL CO.

Booth 225

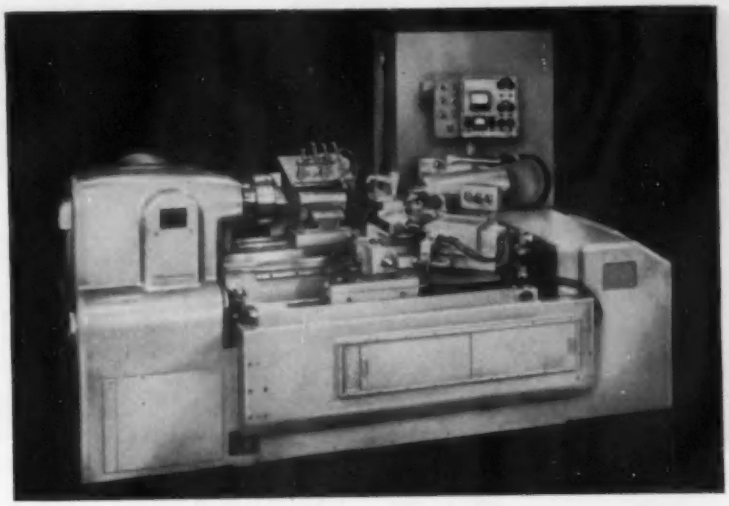
Three additions to the Lusol line of metal-working solutions are K-7, a transparent all chemical solution for grinding; Shamrock, a heavy-duty water soluble chemical emulsion; and Unikool, a transparent all-purpose water soluble metal-working solution. Several machines at the show will be using one or other of the Lusol line of coolants.

K-7, the new transparent grinding solution, is intended for use on all steels and is particularly suited for cast and malleable irons, titanium, carbon, rubber, ceramics and plastics. Non-foaming, it runs absolutely flat under all conditions. It gives excellent rust protection at low dilutions, even on sensitive metals such as cast or malleable irons, and maintains clean wheels at all times.

Shamrock is a water soluble chemical emulsion possessing good cooling and excellent extreme pressure lubricating properties. It is particularly suited to operations where maximum lubricity is required. It has been designed for use in all machine tools including automatic screw machines. It is especially useful when machining at moderate feeds and speeds, or where extreme pressure lucricity is needed as in drawing, stamping, broaching, etc.

Unikool is a new chemical type cutting fluid which has been developed to provide an all-purpose coolant at moderate cost. It combines good cooling with lubricating effect and with the obvious advantage of transparency.

Circle 73 on postcard for more data



Monarch model 21 Mono-Matic

MONARCH MACHINE TOOL CO.

Booth 920

A new high production chucking lathe for first and second operation work features fully automatic cycle control of all cutting tool movements. Both the front and rear tool slides are hydraulically actuated. The front slide, which is equipped with an "Air Gage Tracer" unit, is used for facing and contour turning or boring work up to 15-in. diameter. The rear slide is designed for necking and grooving, and with special tooling arrangements, for facing work up to 13-in. diameter. In the latter case, automatic hydraulic tool relief is a built-in feature.

A platen incorporating hydraulic transverse movement is the mounting member for the front and the rear tool slides. Movement of the platen permits retraction of the tool slides from the work quickly at the conclusion of the cutting cycle. Once the next work piece is chucked in place, the platen rapidly returns the tool slides to the cutting position.

The automatic cycle control permits simultaneous operation of both the front and rear slides. However, either of the two slides may be used individually or the rear slide may be set up to begin its cut after the front slide has completed its operation or vice versa. Three electrical selectors are provided for setting up the automatic cycle operation of the platen, the front slide and the rear slide. These selectors are in addition to the standard motor control selector, cycle start button, and cycle reverse button mounted in the same grouping.

The continuous running main drive motor, which may be either an a-c or d-c unit up to 20 hp, is mounted on an integral sub-base. Drive to the spindle is direct through a magnetic type clutch and brake. The brake is capable of stopping spindle rotation from even the highest speed in less than two seconds.

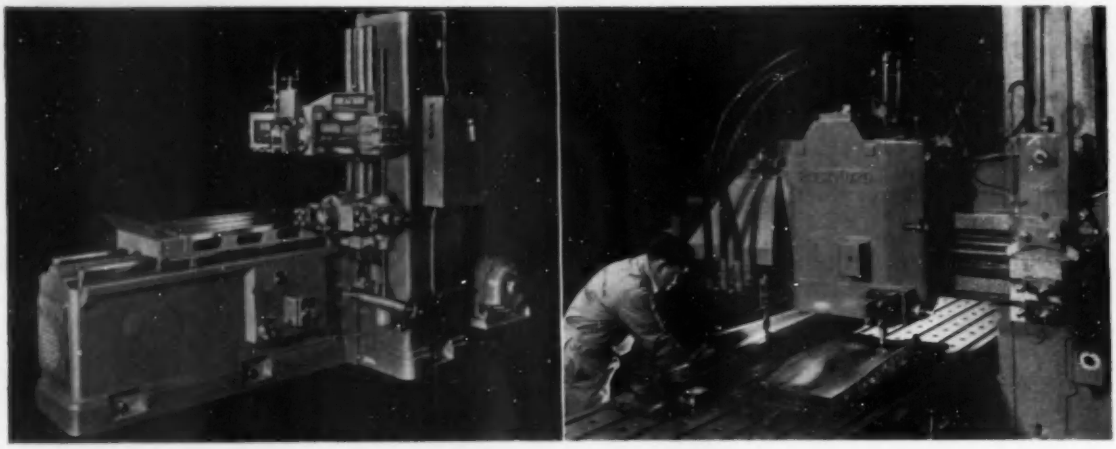
Three spindle speed ranges are available providing a top speed of 900, 1850, or 2700 rpm. The purchaser may choose the particular range which best suits his needs. Eight separate spindle speeds can be secured in each range with pick-off gears.

The spindle, which is supported on preloaded precision ball bearings, is a hardened and ground nickel steel forging with a six-in. A-1 flange type nose. An optional D-1 Camlock nose is available.

The Air Gage Tracer, mounted on the front slide, allows a single continuous tool cut to be utilized for a fine, stepless finish. The tracer template rail incorporates both longitudinal and angular adjustment to speed accurate set-up. The slide may be set at 30, 45, or 60 deg angles by means of a series of tapped holes provided in the ground top of the front feed slide. The front tool slide may be repositioned radially, again by means of tapped holes, to match the angular setting of the tracer.

Upon removal of the rear slide from the platen, the entire front slide may

(*Turn to page* 159, *please*)



Rockford hydraulic shaper, and closeup of Kopy-Kat hydraullic dupllicator mounted on an openside planer.

ROCKFORD MACHINE TOOL CO.

Booth 1423

The latest Rockford hydraulic slotter has the advantages of high ram stroke speeds, infinite speed adjustment, hydraulic feeds and also new conveniences for operation and control. Model SA, 12 in. and 20 in. stroke, has a hydraulic fulcrum drive to the ram and 90 deg table indexing. The table has rotary, transverse and longitudinal feed and rapid traverse.

Also in operation will be the latest model 24 in. special ram-type hydraulic shaper with flame hardened and ground ram ways. These shapers are manufactured in 12, 16, 20, 24 in. special, 24 in. heavy duty, and 28 in. sizes.

The Kopy-Kat duplicator is hydraulically actuated and so sensitive and exact that positive duplication of even the most complex forms may be done with the ease of straight-production machining. The duplicator can be furnished on all hydraulic shapers, planers, slotters, shaper-planers and geared head lathes. It transfers directly from inexpensive masters, or from the original form itself, mounted on the crossrail or table. It will be shown in operation on a 48-in. openside hydraulic shaper and a lathe.

The Openside hydraulic shaper offers planer accuracy and easy setup for all kinds of large size shaping work. This machine reciprocates the workpiece instead of the cutting tool. All work is carried on the box section table, which is supported solidly at all points in its travel by a double-length bed. A side head is available.

Circle 75 on postcard for more data

GARDNER MACHINE CO.

Booth 1115

The new 2H30—30 in. double disk grinder is said to have features that improve rigidity and accuracy. Pump gear blanks will be parallel ground at the rate of 885 parts per hour on a machine tooled with automatic loading and unloading, rotary work carrier and automatic size control. Stock removal from the blanks is 0.010 to 0.018 in., with tolerances of 0.0003 to 0.0005 in. for flatness and parallelism, and 0.001 in for uniformity. Workpieces will be loaded on this machine by a Feedall hopper feeder. This consists basically of an elevator with a roll-chute delivery.

New Gardner double disk grinder, 2H30.

Parts are pneumatically transferred from the roll-chute to an 18-station rotary carrier which produces 594, 780 or 885 ground parts per hour, depending upon the speed setting on the carrier drive. Finished parts are discharged through a chute into a metal basket. Automatic size control is obtained by means of a Sheffield Dual Open jet system and single plunjet and gaging anvil. The measuring system is self-adjusting in accordance with pre-determined settings.

Main features of the new grinder include a new spindle design which increases rigidity at the rim of the 30 in. disk by 500 per cent. A new ways design offers greater stability. A head zeroing indicator now simplifies tilt and swivel setup for adjustment.

The improved 2V18 manually operated vertical double spindle grinder uses easily interchanged 34 in. diameter work carriers. The tool will grind small ceramic switch stators during

R. K. LEBLOND MACHINE TOOL CO.

Booth 1313

Introduction of several new lines of lathes, and special-purpose machines, will be made at the show.

Regal lathes in four models—13, 15, 17 and 19 in. swing—are to be in operation. The drive is through a combination of gears for eight speeds and a timing belt for four higher speeds. Ways are hardened and ground replaceable steel inserts, fitted on the compensating V-way principle. The spindle has three bearings, and the quick-change box is automatically lubricated. Lathes have both a feed rod and leadscrew. Power ranges from three to five hp.

A 16 in. heavy duty engine lathe to be announced offers 27 spindle speeds from 16 to 2000 rpm with the combination gear-belt drive. Center bearing of the three-bearing spindle is supported in the new Timken semi-flexible mount. The heavier apron contains a four-directional power rapid traverse controlled by one lever. Drive is 20 hp.

Larger lathes include 25 and 32 in. heavy duty engine lathes with 50 and 60 hp motors for carbide tooling. They feature adjustable acceleration for control of large workpieces. A 125-hp variable-speed version of the 32 in. lathe provides speeds of 42 to 1400 rpm and 56 feeds from 0.002 to 0.250 ipr.

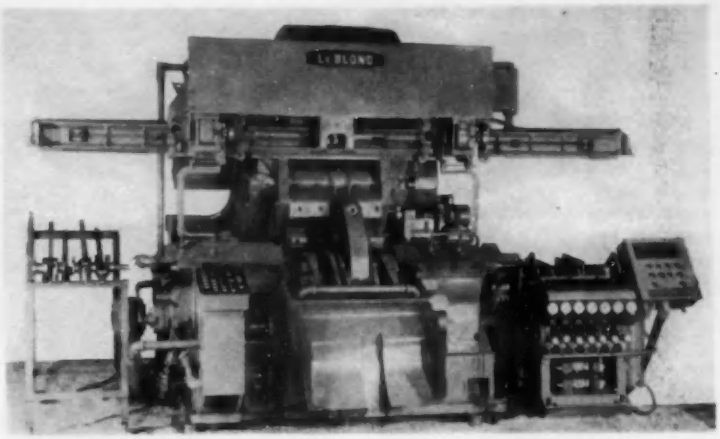
The LeBlond-Carlstedt rapid borer will bore, trepan or counterbore from three to eight times faster than by the conventional D-bit method, according to company claims. Demonstration will include boring 1⅛ in. holes in eight in. long solid stainless 303 at better than seven ipm. The rapid borer was developed expressly to accommodate new tooling which cuts at very high speed with excellent accuracy and finish. Cutting oil is forced between the boring bar and hole wall, forming a continuous bearing. It flushes back through a hole in the boring head and bar, carrying away the chips as its goes. Chip form is controlled both by tool angles and proper feed and speed combination; thus tool faces are kept clean and chip passage clear. Cutter design produces balanced cutting pressures thereby controlling concentricity.

The machine is suited to work that is symmetrical for balance in rotation —round, square, octagonal, tapered or stepped. A wide variety of hole diameters and depths as well as work sizes can be accommodated.

The company will exhibit its new automatic line bearing crankshaft machine. Five main bearings, flange and pilot, sprocket diameter and front end are turned simultaneously; production rate is about 55 crankshafts per hour.

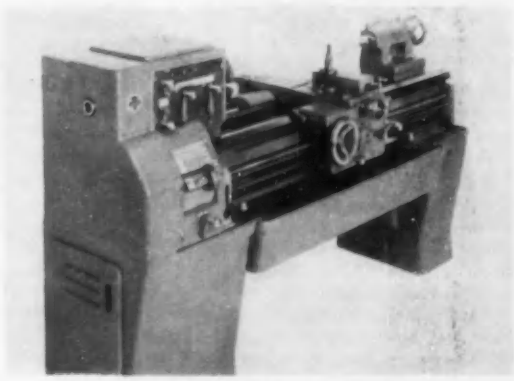
The center drive machine includes arrangement for automatic loading and unloading. Clamping is hydraulic. Machine motions are sequenced electrically for continuous automatic operation. All operations are controlled and indicated from the master push-button station.

Circle 76 on postcard for more data



LeBlond automatic line bearing crankshaft machine with center drive.

LeBlond-Carlstedt rapid bores for trepanning



Typical LeBlond Regal series lathe

a special demonstration. It will remove from 0.010 to 0.016 in. of stock at a production rate of 1200 parts per hour. The required tolerances are 0.002 in. for flatness and parallelism, and 0.004 in. for uniformity. Parts are loaded by the operator and gravity discharged into a basket.

Circle 77 on postcard for more data

NATIONAL AUTOMATIC TOOL CO.

Booth 1123

A 1/12 scale working model of a 120-ft Natco Holeway machine on display is said to be fully automatic and to simulate every operation of its actual size counterpart which is now machining approximately 106 cylinder heads per hour. This model will enable the observer to closely follow the complex operational sequence of 60 individual operations in all within a distance of ten ft. It will simulate drill, ream, mill, core drill, counterbore, spotface and chamfer all six sides of miniature cylinder heads. Then it removes chips, inspects hole depths, and sizes and centers distances. The model checks the cylinder head oil gallery hole and rejects defective parts and replaces them with salvaged ones.

The machines to be shown include:

B33D vertical multiple spindle high speed sensitive tapper. The machine is a new design arranged with hydraulic motor drive to the spindles and provided with a sensitive air feed, accurately balanced table feed.

H6 vertical multiple spindle high speed sensitive driller and tapper. The machine has a hydraulic feed table and is arranged with a three-position automatic fixture slide interlocked with the machine for automatic drilling chamfering and tapping operations.

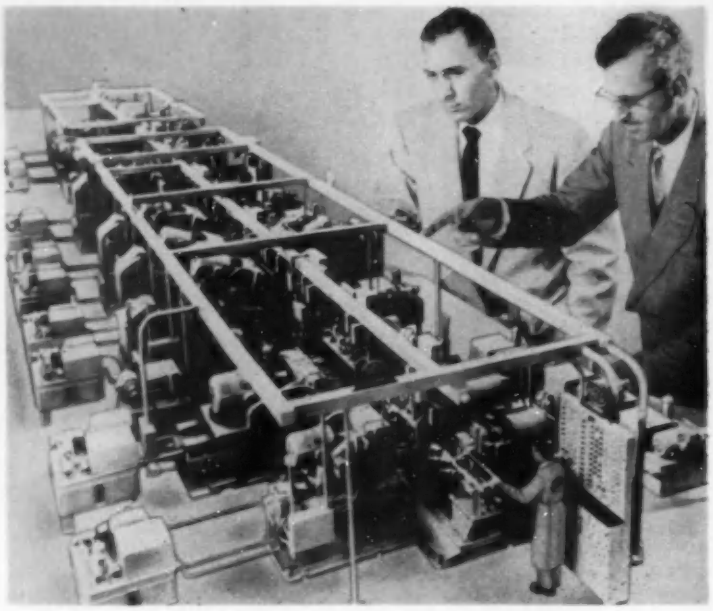
D4B vertical multiple spindle heavy duty drilling machine. It is arranged with an automatic hydraulic index rotating table.

B42 mechanical feed unit. This unit is arranged with a screw feed operated through a dial control system for fast, positive feed selection.

A special machine incorporating small sensitive units arranged in horizontal angular and vertical positions around a rotating table. This machine will illustrate the use of special way machines.

C20B Borface machine, for heavy duty boring, turning and facing. It will be set up to simulate these operations on a large valve.

Circle 78 on postcard for more data



Natco Holeway scale model of a cylinder head line, in full working order.

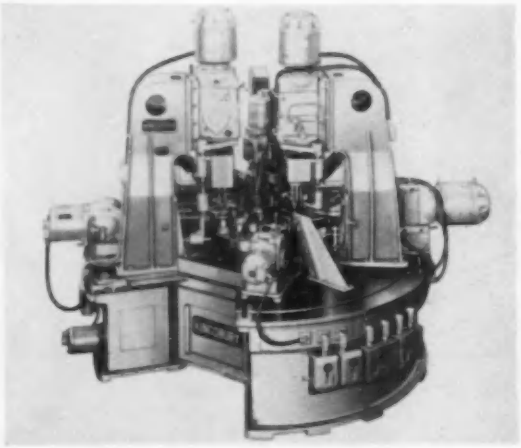
KINGSBURY MACHINE TOOL CORP.

Booth 915

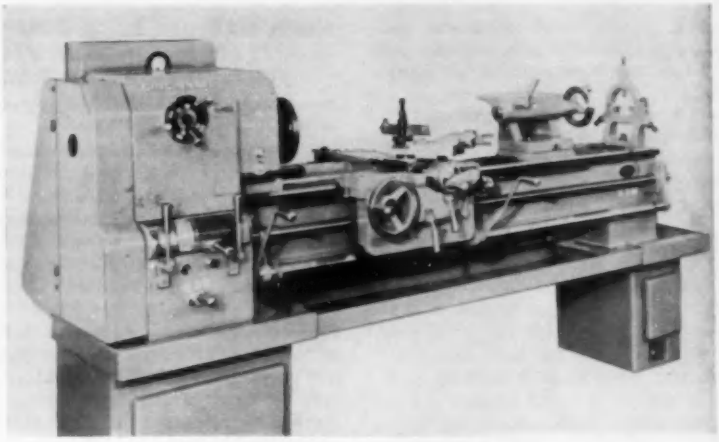
To illustrate the ability of a Kingsbury machine to work on four faces and from the vertical, a 12 station, 28-spindle automatic indexing machine with a 100-in. diameter base and with 12 rotating, work-holding fixtures will be demonstrated. Seven automatic drilling and tapping units will drive the 28 spindles. The work will be rotated three complete turns during one trip around the machine permitting subsequent operations in a hole each time it presents itself to the tools.

The main automatic index table indexes 30 deg (12 times) for one complete revolution while work holding fixtures rotate 90 deg counterclockwise each index of table. The machine will drill, countersink, hollow mill, ream and tap, doing 1st and 2nd operations in as many as fourteen holes in a demonstration run.

Circle 79 on postcard for more data



Kingsbury 12-station automatic indexing machine with 12 rotating fixtures.



Cincinnati Tray-Top model LE engine lathe.

CINCINNATI LATHE & TOOL CO.

Booth 300

All-geared head model LE Tray-Top engine lathes in 10, 12½, 15 and 18 in. sizes are announced. They have 12 spindle speeds in geometric progression, with a three-lever, color-match, direct-reading shift mechanism. The spindle, with long taper key drive nose, is rigidly mounted in three precision bearings. All headstock bearings are pressure lubricated. Forty-eight thread and feed changes are made available through a totally enclosed, automatically lubricated quick change gear box.

The apron is a one-piece, double-walled casting with automatic lubrication. Longitudinal and cross feeds are engaged with drop levers operating positive jaw clutches, and a spindle start-stop control lever is supplied at the apron and quick change box. The bedways are ground, and will be hard-clad flame-hardened on demand. Lubrication of the carrage ways and cross-slide is provided by an oil shot system in the apron. The lathes are offered with a 1, 1½, 2 or 3 hp motor, mounted on the rear of the headstock leg.

New 16 in. sliding head bench, floor and multiple spindle drilling machines are announced. The drills may be ordered with geared power feed. A simple selector is used to obtain any of four rates of feed which are engaged through a positive-jaw clutch. The entire power feed mechanism is built-in and completely housed in the head. A new direct-reading depth dial with positive stop is provided. When the drill is equipped with power feed, the dial may be set to disengage feed automatically.

The spindle is full-floating, being mounted in precision, sealed, lifetime lubricated ball bearings. A simple V-belt drive transmits motor power directly to the spindle. A unique tilting motor bracket is provided to make spindle speed changes easy. The drills are rated at one in. in cast iron with a one hp 1800 rpm motor. A No. 2 Morse taper spindle in standard. A No. 3 Morse taper spindle is optional if specified.

Circle 80 on postcard for more data

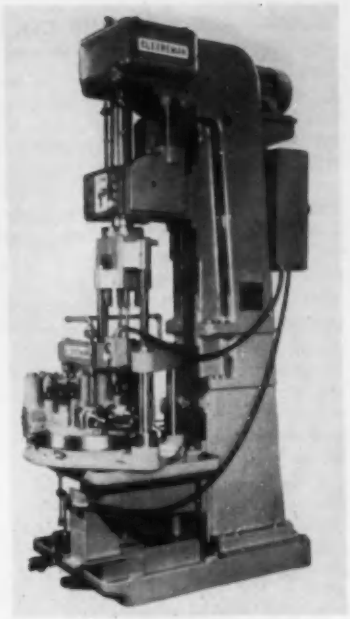
G. A. GRAY CO.

Booth 1120

The 36-in. by 10-ft universal planer to be demonstrated cuts on both forward and reverse strokes. Its feed range is in 64 increments from zero to one in. It also triple cuts—it finish planes while it double-cut roughs. The planer will cut light occasional cross keyways and corner chamfers without extra setting. The 25-50-hp variable voltage drive machine uses standard carbide tips in simple holders.

The 36-in. by eight-ft openside Handymill features dial control for making lap cuts. Heads and quills are locked hydraulically and are power lifted and positioned. Other features include power draw bar, 25-hp non-swiveling milling rail head and boring side head, pendent control, automatic indexing, non-metallic bearings. Model 650 FC horizontal boring, drilling and milling machine can be set to 0.00025-in. accuracy by push button control.

Circle 81 on postcard for more data



Cleereman series "A" Drilling Machine

CLEEREMAN MACHINE TOOL CO.

Booth 1007

New models of production drilling machines and jig borers and also improved layout drilling machines and sliding head upright drilling machines will be demonstrated.

Two models of a new series A automatic production type drilling machine, one demonstrating high speed drilling operations and one performing precision tapping will be shown. Box column and round column upright sliding head drilling machines with improved set-up facilities, increased spindle capacity and drive will be operated on heavy drilling and lead screw tapping work.

The new jig borer will be demonstrated on ultra-precision layouts. Boring, drilling, tapping operations will be performed on an almost completely automatic basis. Work positioning is completely automatic and does not involve any manual handling for operation of the table and saddle slides. The structural design gives full support to heavy work throughout the range of the machine. A new and original guide design insures ultra-precision table and saddle alignment. A new approach to spindle nose tooling speeds the operation of this machine tremendously.

Circle 82 on postcard for more data

BLANCHARD MACHINE CO.

Booth 406

The following machines will be on display: No. 18C vertical spindle rotary table surface grinder; No. 11 vertical spindle rotary table surface grinder; adjustable gap type demagnetizer cylinder wheel holder; an assortment of abrasive wheels; and monochromatic light and optical flat for checking flatness of ground surfaces.

This will be an exhibit of Blanchard surface grinders, grinding wheels and accessories. It will show two grinders in operation and through these and the photographs and sample parts, demonstrate the many applications and uses of Blanchard surface grinding equipment.

The No. 11 Grinder, the smallest of the machines, will be used to demonstrate the extreme accuracy, flatness and surface finish obtainable. This is shown in a hardened steel valve plate ground flat within ½ light band (0.0000058 in.) with a surface finish of 1½ microinches. A new feature of the No. 11 grinder is power table traverse, used to speed up the movement of the table from loading to grinding position and to help reduce operator fatigue.

The No. 18-C Grinder has been developed to accomplish by means of automatic cycle control, most of the operations ordinarily performed by the operator when running a grinder, including size control. On suitable work, a tolerance of ± .0005 in. can be held in regular production. After initial setup, the operator loads the work on the magnetic chuck, closes the circuit to the chuck, presses the cycle start button, and the grinder completes the grinding cycle, returning the chuck to the loading position without attention from the operator.

Another development is the cylinder wheel holder which eliminates sulphuring cylinder wheels into rings and reduces the time required to change wheels.

The six-in. adjustable gap type demagnetizer will complete the exhibit.

Circle 83 on postcard for more data

CLEVELAND TAPPING MACHINE CO.

Booth 409

To be shown for the first time, the new Cleveland Jr. multi-spindle drill tapper was designed as a flexible machine for multiple small-hole drilling and tapping. It is equipped with a universal-joint head which will drill up to eight No. 25 holes or tap eight No. 10-32 holes within a maximum bolt circle of eight in. The standard head furnished with the machine has eight spindles adjustable to a minimum distance 11/16 in. between spindles. Fixed center heads or adjustable heads and heads with fewer than eight spindles can be furnished when specified.

In operation, the head remains stationary, the table which has three T slots for fastening fixtures being raised to engage the tools and feed them into the work. This operation is similar to the feed of conventional drill presses, downward pressure on a lever turning a gear engaging a rack which raises the table. The table is adjustably spring-balanced to compensate for variations in weight of work and fixtures and has a vertical travel range of four in. The head is also counterbalanced in the column for ease in raising and lowering.

The bench radial drill, to be shown in operation, was designed to combine the convenience and accuracy of a sensitive drill with the range and capacity of a large machine and the flexibility of a radial drill. Finger-tip selection of any of the eight spindle speeds from 160 to 3140 rpm is provided by a single belt-releasing knob and sensitive, uniform feed is provided by a hand wheel. Traverse of the head on the arm is by means of a hand wheel and screw with two turns per inch of travel. The arm is raised and lowered by means of another large hand wheel and spiral gear. Self-equalizing, clamps are provided for head, arm and table, the

NEBEL MACHINE TOOL CORP.

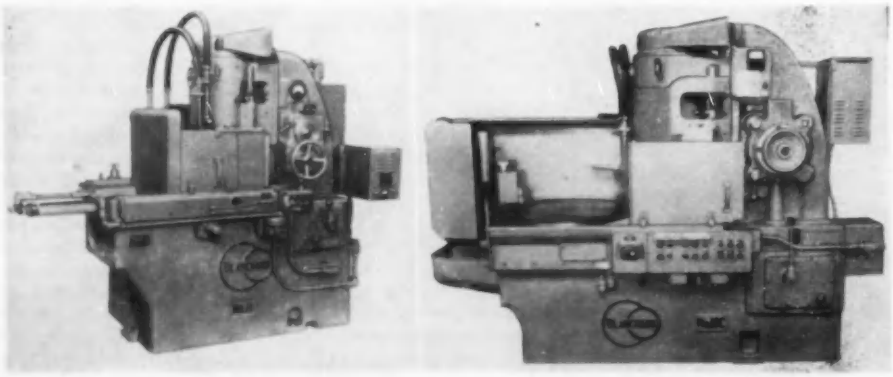
Booth 511

Introduction of a new 20/40-in. size extension bed gap lathe, to be known as the Imperial, is announced.

The new model swings 24½ in. over the ways and 42 in. through the gap. All heavy components—including the heavy duty tailstock and the sliding upper bed—are power actuated. With a single speed 10 or 20-hp motor, the lathe delivers 18 spindle speeds 11 to 666 rpm, or 16 to 1000 rpm. With a two-speed motor, 36 spindle speeds are available ranging from 5 to 666 rpm or 8 to 1000 rpm. All headstock gears are shaved and hardened and the entire gear train is lubricated automatically with an oil spray. Shafts throughout the lathe are mounted on anti-friction bearings including the headstock spindle which rolls on three bearings.

The quick change gear box is completely enclosed and offers a wide selection of 60 feeds and threads through an exclusive Nebel-designed selector. Gears are lubricated automatically. The sliding upper bed is a new design and consists of a combination box girth and diagonal ribbing. Hardened and ground steel carriage ways may be added.

Circle 84 on postcard for more data



Blanchard No. 11 grinder with power table traverse, and No. 18C grinder with automatic power cycle control

MACHINE TOOL SHOW

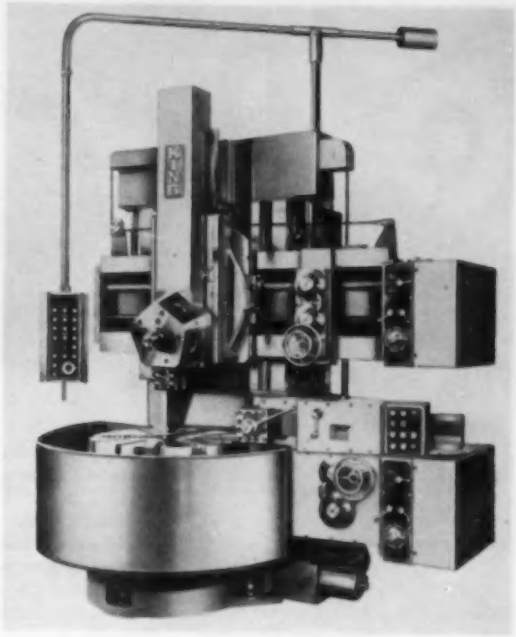
AMERICAN STEEL FOUNDRIES
ELMES ENGINEERING DIV.
KING MACHINE TOOL DIV.

Booth 1121

One of the newer developments of the Elmes Engineering Div. is a portable hydraulic descaler. It is used to remove forging scale from hot billets prior to closed die operations. It sprays a small amount of hot water at high pressure as the billet travels through the spray. It automatically ejects the scale-free billet. It will handle billets up to 32 in. long and six in. in diameter, with side and end feed operation. Cycle time for a full-length billet is said to be two seconds.

Also on display will be a 150-ton pipeless hydraulic press for drawing, forming, etc. All high pressure fluid flows through passages drilled in the structural parts. A 100-ton C-frame press will represent the line for forcing, straightening, bending, forming, etc. The basic press has a U-gap in the bed. Directional control of the ram is by lever or foot pedal.

The King Machine Tool Div. will display two vertical boring and turning machines—a 36-in. single column model and a 56-in. double column model. The redesigned line provides 40 to 50 hp on the 30 to 46-in. sizes, and 75 to 100 hp on 56-in. and larger sizes. Twenty-four feeds and speeds are available. Controls were simplified and located on the movable pendent. Spindle mountings were redesigned; ram overhang is lessened.



King 36-in. single column vertical boring and turning machine.

Circle 85 on postcard for more data

machine having drilling capacity of ½ in. in tool steel or one in. in cast iron or mild steel.

Operated by a Geneva drive, the recently-announced 21- and 34-in. diameter automatic power-driven index table was designed to provide a positive, dependable unit for drilling, tapping and other sequence operations. Six, 8 or 12 stations can be provided. Motion is imparted by a large-diameter needle-bearing cam follower operating in ways faced with hardened and ground tool steel wearing plates. An accurate lock pin, actuated by a cam plate enters the ways before the cam follower leaves them, making it impossible for the table to be free-wheeled or get out of time or mis-index.

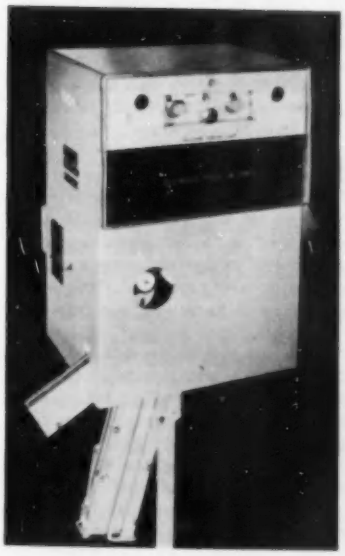
The locking pin projects through the under side of the table and its up-and-down movement opens and closes an off-and-on limit switch which controls the current supply to the machine on which the unit is installed.

Circle 86 on postcard for more data

ILLINOIS TOOL WORKS

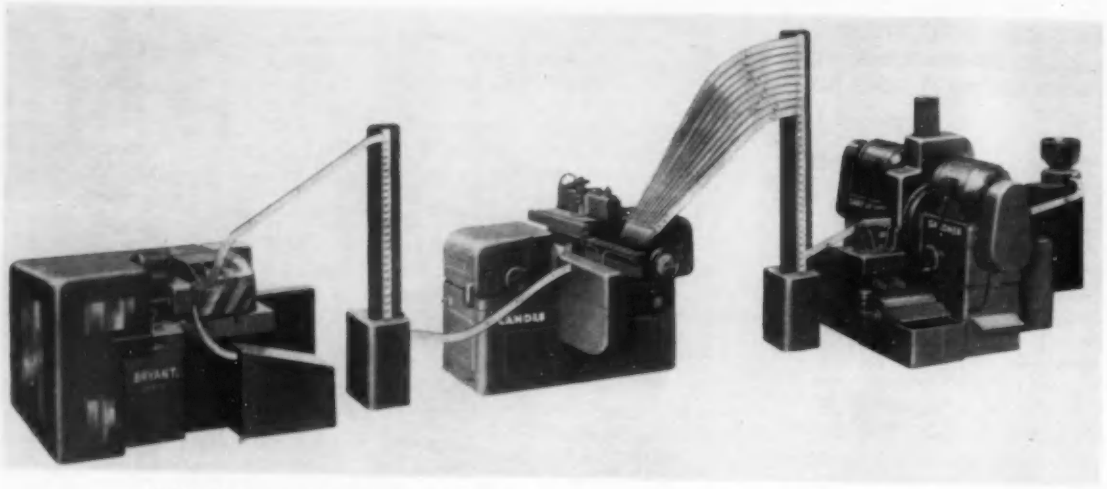
Booth 1323

A new automatic gear size control unit has been developed to bring increased economy and efficiency to high production gear manufacturing. The unit rejects gears that are undersize and oversize. It accommodates gears up to three in. in diameter in various pitches and face widths, and can be set to any tolerance from 0.0001 in. to as coarse as desired. Rejected gears are delivered out of one chute, and passed gears are delivered through another chute. In addition, the unit has an integral, continuously operating computer that shuts off production when the percentage of rejects reaches a predetermined level, or after a certain number of continuous rejects. Percentage-of-rejects selector can be set at any one of 30 levels, from one to 33⅓ per cent. The consecutive reject selector can be set from 1 to 10. When the control unit shuts off the hobbing, shaping or shaving machine, a red light goes on. The computation is continuous. Each time a good gear is passed, the continuous reject counter returns to zero. With each gear passed or rejected, the percentage is recomputed.



New Illinois automatic gear size control unit is shown at left.

Circle 87 on postcard for more data



Ball bearing race line to be operating at the Landis booth, with Gardner, Landis and Bryant equipment.

LANDIS TOOL CO.

Booth 1117

Grinding machines of three manufacturers will be tied with automatic transfer equipment to demonstrate production of ball bearing outer races. Cooperating in the venture are Landis Tool, Gardner Machine Co., and Bryant Chucking Grinder Co.

To start the three-way cycle, work pieces are placed in a vibrating type hopper and transferred automatically to the loading mechanism of the first machine in the line, the new Gardner 2H30 26 in. precision horizontal double disk grinder. Using the through-feed method of grinding, the parallel sides of the rings can be ground to size automatically at the rate of 6000 per hour.

Stock removal is 0.006 to 0.008 in., with 0.0001 in. for flatness, 0.0002 in. for parallelism, and 0.0005 in. for uniformity. Loading, sizing and transfer of the parts is done automatically. Sizing control is maintained automatically by a Sheffield Plunjet and gaging anvil Lectrolair control.

After the sides are ground, the parts are automatically unloaded into the transfer mechanism for delivery to the second machine, the Landis No. 12½ centerless grinder. Parts are delivered and the outside diameters are ground in multiples of 10 parts per loading cycle. This is done by automatic receiving and stacking of the work parts in the loading device before they are loaded between the grinding wheel and regulating wheel of the machine. A built-in automatic feeding mechanism controls diameter size by feeding the grinding wheel head into the work. The rate of feed is pre-set by adjusting the feed rate valve.

Next the parts pass automatically through a Sheffield air gage. The parts are again picked up by the transfer mechanism and conveyed to the Bryant 2209-G automatic internal grinder. The Bryant grinder is equipped with a shoe centerless fixture and a magnetic work driver with an automatic radial diamond holder. This holder arrangement permits dressing the correct shape on the grinding wheel for grinding the internal ball race.

Grinding of the race diameter is controlled by diamond sizing. To speed production, the machine is cycled to dress only at intervals. The machine cycle can be altered to dress the wheel at any desired number of pieces. A post gage, combined with a feed compensating mechanism in the machine, keeps the work part size within the required tolerances. After internal grinding, this gage measures each raceway diameter. The resulting information is analyzed to determine the trend of size variation. If the trend is of sufficient importance, a signal is sent to the feed compensating mechanism in the machine. Over-size and under-size parts are thus rejected by the gage.

Valves for internal combustion engines can be automatically ground at extremely high rates of production on a battery of different type valve grinding machines hooked up in series. This includes grinding the stem, face and length. Two Landis grinders and one Gardner disk grinder will be combined to grind the valve stem, tapered valve seat and the length of the valve stem. The process will incorporate automatic loading and unloading, automatic grinding cycles, and automatic transfer devices.

The grinding cycle is started by loading the valves into a vibrating type hopper. At this point they are picked up and transferred automatically to a Landis No. 12½ centerless grinder, the first machine in the battery.

This machine finish grinds the diameter of the valve stem. Here the work is fed into the grinding wheel by means of the regulating wheel which is dressed in the form of a cam or eccentric. One revolution of the regulating wheel is required to finish grind the valve stem to size. The grinder is capable of producing at the rate of 1200 pieces per hour. Stock removal from the valve diameter is 0.003 in., and tolerance is held within 0.001 in. The part is ejected and automatically transferred to the loading mechanism of a Landis type H valve face grinder. This grinder finish grinds the tapered valve seat to an allowable maximum run-out of 0.002 in. after removing 0.005 in. of metal from this surface. The machine has automatic infeed of the wheel head.

Both of the above machines are equipped with an automatic dressing cycle which can be set to function at any pre-determined quantity of parts, and automatic wheel advance.

After the valve seat grinding cycle is completed, the part is automatically ejected into the transfer mechanism and carried to a Gardner No. 723/23 in. dual head valve grinder for the final operation. At this particular point

the stem end is ground to length.

This machine finish grinds the stem ends at a rate of 2400 per hour. Stock removal is 0.028 to .038 in. Squareness is within 0.0004 in. total indicator reading, with reference to outside diameter of the stem, and uniformity required is 0.004 in. stem tip to gage line.

The valves from the Landis grinder are loaded in a 21-station rotary carrier on the Gardner machine by a chain loader. Stock removal is by progressive grinding—semi-finishing on the front disk and finishing on the second.

Two improved semi-automatic plain and cylindrical grinders will be demonstrated, the 6 by 18-in. type K and the 10 by 36-in. type K. A new universal grinder, the 12 by 36-in. type K, will be introduced.

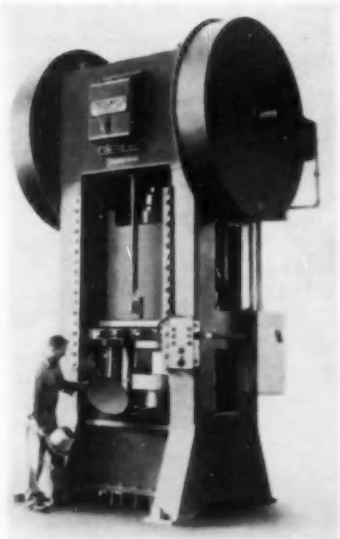
Circle 88 on postcard for more data

STEELWELD MACHINERY DIV., CLEVELAND CRANE & ENGINEERING CO.

Booth 1418

Three large machines, a shear, a bending press, and a Hi-Draw press will be exhibited.

The shear, operating on the pivoted-blade principle, will cut mild steel to 12 ft by ½ in. The blade will travel in a circular path without the use of guides and slides, common with guillotine-type shears, thus eliminating a principal source of wear and shearing inaccuracies. Other features include an electric foot switch, an air-operated clutch and brake, and Micro-set knife adjustment.



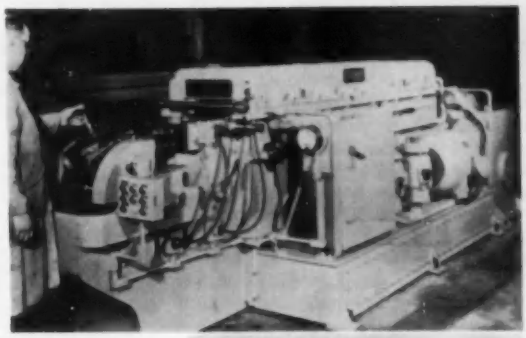
Steelweld Hi-Draw press (215 ton)

The bending press will handle steel plate to 10 ft by ½ in. It can be used for various operations such as bending, forming, blanking, drawing, rubber-forming, multiple-punching, etc.

The Hi-Draw press was developed for high-production deep-draw work. Being exhibited for the first time, the machine is rated at 215 tons and has a height of 16 ft. 8 in. It is designed to operate at high speeds during the non-productive portion of the ram stroke and at a slower, correct drawing speed during the working part of the stroke. This is accomplished through a newly developed linkage that provides quick approach, quick return and slow constant velocity through the drawing range.

Press operating speeds may be up to 80 per cent greater in strokes per minute than for an equivalent crank press with the same stroke, and yet provide the same drawing speed. The tonnage available at any point in the working range is greater than for a standard crank press.

Circle 90 on postcard for more data



Continuous machine broaching connecting rods.

LAPOINTE MACHINE TOOL CO.

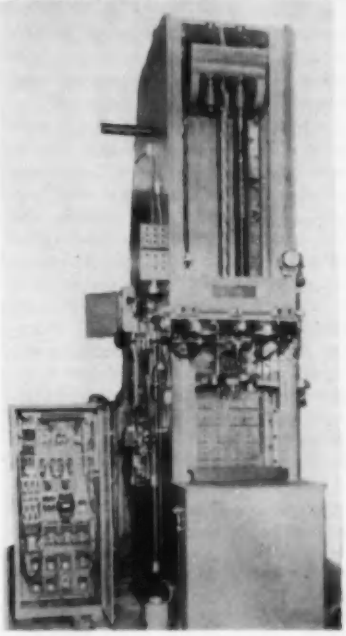
Booth 707

The outstanding exhibit will be an electric-drive, vertical pull-up broaching machine, broaching spiral gears for the automotive industry. Model VUE-7, with a 72-in. stroke, pulls two broaches simultaneously, using a 50-hp motor that develops 25 tons pull. It will broach 320 spiral gears per hour. The machine can develop speeds up to 40 fpm.

Another new broach is the 120-in. continuous machine, said to be the largest manufactured to date. It has 24 fixtures for holding automotive connecting rods, and will broach at the rate of 1300 parts per hour.

A horizontal electric drive machine also to be shown has a 50-hp motor to surface broach 25-tooth involute gear sprockets, at the rate of 25 pieces per hour. All Lapointe machines will feature the new electromotive drive, giving speeds up to 280 fpm.

A single ram horizontal machine with 180-in. stroke broaching a J-57 turbine wheel, and a small 60-in. capacity continuous machine broaching electric typewriter parts at the rate of 600 pieces per hour, will also be demonstrated.



VUE-7 machine broaching spiral gears.

Circle 89 on postcard for more data

WIEDEMANN MACHINE CO.

Booth 1420

Completely automatic turret punch presses will be introduced to make complicated hole patterns, including openings of many sizes and shapes. The operator merely loads the material and unloads the finished work.

The press and work locating table are controlled by a tape fed programming unit to perform all functions automatically — simultaneously positioning work under punch, selecting turret station carrying proper punch and die (any one of 20 up to six in. square), then tripping the press. This is automatically repeated until all holes are accurately located and punched.

All phases of the Wiedemann method for short run production will be demonstrated on presses, combining the speed of a punch press with turrets carrying 12 to 32 punches and dies and a quick-setting, mechanical work positioning gage. They eliminate setup, layout and other preparatory punch press work, in which the quantity does not warrant a die set. Piercing will be done on products in the electrical, electronics, refrigeration, instruments, air conditioning, aircraft, textile, railroad, roadbuilding, machine tool, and other manufacturing fields.

The four-ton RA-4P press, used in high-speed piercing of printed circuit wiring boards and the 40-ton capacity RA-61, equipped with optical dimensioning instruments will also be shown.

Both machines and the 15-ton RA-41P press, are equipped with a follower gage providing high-speed, low-cost duplication of intricate hole patterns in short run production. Work is fastened to the cross slide and accurately follows its motion as the operator moves the stylus to a series of color-coded holes in a template, secured to the table. Holes are located to ± 0.005 in., and punched at the rate of 30 to 120 holes per minute.

In addition to the RA-61, two other 40-ton capacity R-61 presses, one equipped with latch type gage and the other with a direct measuring table and gage and the 15-ton R-44 with rack type gage, will be demonstrated.

Circle 91 on postcard for more data

LEES-BRADNER CO.

Booth 701

A single spindle model 7 type HD heavy-duty high production gear hobber will be presented for the first time. It will be equipped with self-loading and unloading devices. By means of a checker and a feed-back arrangement the machine will adjust itself for pitch diameter control and signal for shifting the hob. The type HD is also available in four and six spindle rotaries.

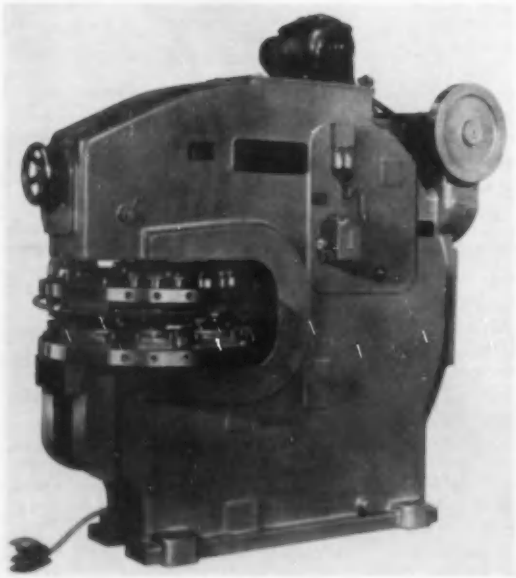
Both the HD and its predecessor, the type A, equipped with Auto-Motion use two types of self loading and unloading devices. The display machine will be equipped with the straight shuttle type loader and unloader. The other type of self loader and unloader is a crank type transfer arm actuated by an hydraulic cylinder. In both types a vibratory feeder has been used.

The checker is electrically connected to the machine. The first position checks the pitch diameter. When a predetermined number of gears are undersize, it signals the machine's compensating mechanism for in and out adjustment, as required. In the second position the checker examines the root fillet growth, the checker signals the machine to shift the hob and thus bring new cutting edges into action.

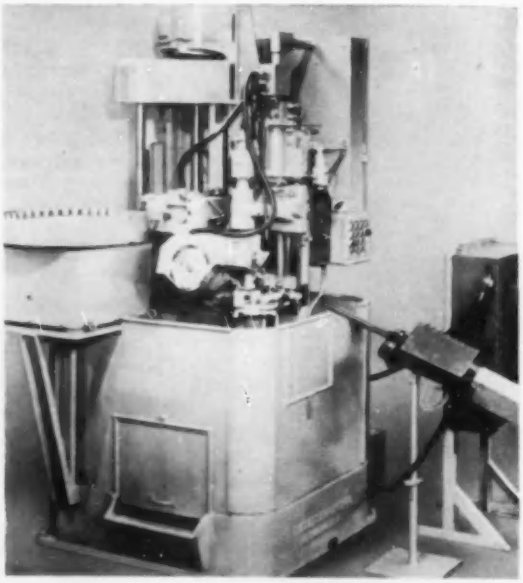
The hob is shifted when wear becomes apparent resulting in more uniform hob wear and less grinding back of the teeth during sharpening. Adjustments to the machine take place only between hobbing cycles. A third connection between checker and machine stops the machine, should a number of out-of-tolerance gears be rejected.

The combination of features on the model 7 type HD and the type A provided the basis for the development of Auto-Motion. The closed cycle of the machine lends itself to efficient self loading and unloading equipment.

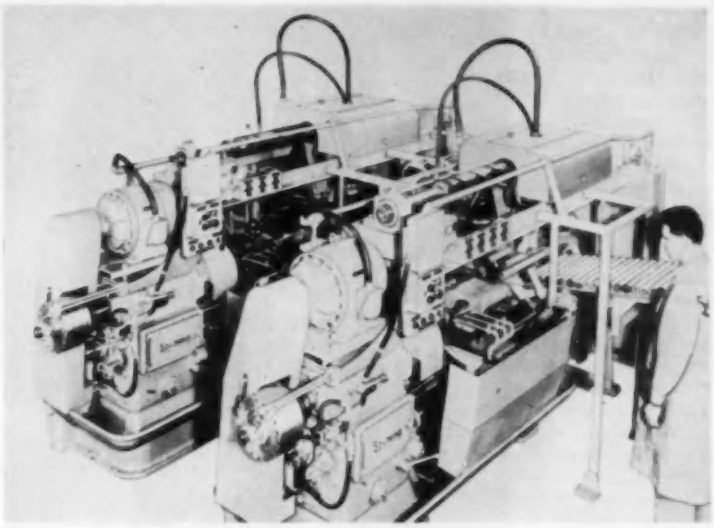
Circle 92 on postcard for more data



Wiedmann R-61 turret punch press



Lees-Bradner model 7 type HD single spindle gear hobber, equipped Auto-Motion.



Seneca Falls Lo-Swing lathe setup for automatic turning of shafts.

SENECA FALLS MACHINE CO.

Booth 1013

A 60-in. model APT Lo-Swing tracer lathe will be tooled for turning shafts. This machine has a completely automatic cycle and provides automatic change-over from rough to semi-finished, to finished turning. Its design permits unlimited carriage travel up to full bed length.

New also is a model LRT lathe designed for chuck work. This machine features a short, platen-type bed, fully-automatic cycle, and built-in. longitudinal and cross feeds at angles which can be suited to the work.

The model DR drilling unit, a production drilling and tapping head with mechanical feed through a lead screw and anti-friction bearing nut, is equipped with rapid traverse, electric control clutches, 10-hp motor and has a maximum feed stroke of 20 in.

Two IMP lathes will be in operation; one turning small rotors and the other turning powered iron gears. The former is automated with a new type, automatic work handling device, having wide application in plants machining small shafts and other parts on a production basis. The second IMP is automated with a rotary type loader.

An installation of two 34-in. model LR lathes, complete with work handling and work transfer equipment, will be shown. This installation handles a sequence of machining operations on 1½ by 22-in. electric motor shafts.

More conventional are a 40-in. model AR lathe, turning machine tool shafts automatically, a 42-in. model CS drilling and centering machine, equipped with automatic loader, centering electric motor shafts, and a second model CS, centering the shafts being machined on the model AR and APT lathes.

Circle 93 on postcard for more data

PEERLESS MACHINE CO.

Booth 322

Sawing machines will be shown which have many improvements made in recent months. The 18 by 18-in. vertical heavy duty hydraulic machine will now saw metal up to 10 sq in. per minute. Other machines on exhibit include the 11 by 11-in. Hydra-cut available with an automatic bar feed conveyor; the 7 by 7-in. Mechani-Cut with automatic bar feed; the three-speed 10 x 10-in. Standard type; and the 6 by 6-in. Speedy-Cut saw, in both two- and three-speed models.

Circle 231 on postcard for more data

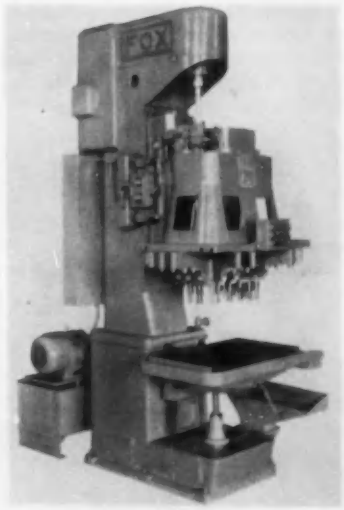
FOX ENGINEERING CO.

Booth 419

Fox will show a new E-60-HT vertical multiple spindle hydraulic-feed drilling and individual lead-screw-feed tapping machine. The machine has a 12 by 24 in. adjustable-spindle head equipped with sixteen spindle pinions for 1⅜-in. universal joints. Head and slide are hydraulically counterbalanced. Spindle speed change, over a range from 202 to 990 rpm, is by pickoff gears located in an accessible case atop the head. The spindle motor is 7½ hp, with individual motors for the hydraulic pump and the coolant sump.

For drilling, Fox type A 1⅜-in. 2- or 3-MT drill spindle and arm assemblies are used. Drilling stroke available is up to 12 in. For tapping, Fox type AT 1⅜-in. lead-screw-feed tapping spindles are substituted for the type A drill spindle assemblies. The tap spindles themselves accommodate up to a two-in. stroke to give a total of up to 14-in. stroke available for the tap cycle.

Both the drill and the tap cycles are automatic, initiated when the operator depresses the "Cycle Start" push button. The drill cycle is: rapid advance, coarse feed, fine feed, dwell at reversal point, and rapid return. The tap cycle is: rapid advance to a positive stop, tap spindles start to feed taps at lead-screw rate, tap spindles reverse to retract taps and return spindles to their retracted posi-



Fox vertical multiple-spindle drilling and tapping machine.

tion where they brake to a stop, head returns at "rapid-return" rate to normal up position. The machine complies in all applicable respects with current JIC standards. Several possible table arrangements are available. The show machine has an adjustable-height table with 21x36-in. work area and generous coolant trough. Table height may be varied from a minimum of 24 in. to a maximum of 37 in.

Circle 94 on postcard for more data

Arter Jigmatic tape controlled electronic digital positioning table in use.

ARTER GRINDING MACHINE CO.

Booth 1308

Jigmatic tape controlled electronic digital positioning table is a new device for automatically positioning a work piece under or in front of a drill tap boring tool. It eliminates the necessity of the operator manually moving a drilling head and arm as in a radial drill, or a slide as in other machines, to positions indicated by reading a dial, a vernier measurement or by setting stops.

The control of movement is completely in the tape. The operator is responsible only for the machining operation. It eliminates the necessity of making jigs, special measuring rods or accurate adjustable screw rods.

On a given size table several hundred holes can be drilled in the work, the limiting factor being only the length of tape that can be handled on the reels. The table can be moved in 0.001 in. increments. There is no resetting of the work after having drilled a small number of holes.

The tape is punched from engineering drawings, the holes being dimensioned decimally from X and Y coordinate axes. A template type hand punch can be used. Once the tape is correctly inserted in the reader of the console the operator presses a button to move the tape to the first and

PARKER-MAJESTIC, INC.

Booth 415

The semi-automatic internal grinder may be used either as a conventional machine or for automatic operation. Two models, having 10 in. swing over the table, are available.

P-M semi-automatic precision grinder.

One has a 12 in. table travel and the other 24 in. Hand or power feed may be used. Four speeds are provided: 12, 24, 36 and 48 ipm. The table may also be actuated by means of the Reciprocator, which is a lever arm mechanism. In automatic operation a cam controls the in-feed.

In the cycle of operation provisions have been made for loading, rough grinding, wheel dressing and finish grinding. Spindle infeed is a direct function of table reciprocations. A special diamond wheel dresser is mounted in a graduated micrometer type barrel.

In the No. 2 surface grinder the handwheel, controlling the vertical elevation of the spindle, has been incorporated into the cross-feed saddle of the machine. One complete turn of the handwheel mechanism raises or lowers the grinding spindle only 0.010 in. The linear spacing between 0.0001 in. graduations is ⅛ in. on the four-in. diameter control wheel.

Circle 96 on postcard for more data

BAKER BROTHERS, INC.

Booth 1421

The main display will be a three-unit transfer machine containing many new developments in tooling. The machine consists of newly designed units for combination boring and counterboring at one station, cross feed facing at another station, and multiple drilling at the third station.

One unit is equipped with a cross feed facing head with electrical provision for constant surface feet-per-minute during progression of the cut. This unit will also be shown as a single spindle for heavy duty boring and counterboring. Another unit will perform multiple drilling operations. All units of the machine are tied together as a transfer machine. The display will prove the feasibility of transfer equipment for semi-high production and versatile production requirements.

Circle 97 on postcard for more data

then to successive drilling positions.

Under the tape are numerous spring loaded contact points. Those finding holes in the tape close the circuits necessary to move both tables to the indicated position.

The unit to be shown has a work table positioning capacity of 20 by 30 in. It comprises a base and two slides at 90 deg to each other. Each slide is independently driven by one-hp motors and both move at the same time. Maximum spacing time is 15 seconds. Final drive is through a revolving lead screw, this being driven from the motor through a system of reduction gears and clutches and so electronically controlled as to finally position each table at a slow speed and always in the same direction. The slides are automatically locked by means of an electro-magnetic brake. Accuracy of positioning claimed is 0.001 in. in 10 in.

Among other new machines Arter will introduce is their Model E-16 in. hydraulic rotary surface grinder. This is a vertical column type machine having a rectangular sliding table with a rotatable magnetic chuck mounted thereon. It is built in two sizes, 12 and 16 in. chuck capacities. The wheel spindle is mounted in precision taper roller bearings and grinding is done by the periphery of a 16 in. diameter grinding wheel. A concentric line pattern of finish is produced on the work. Flat surfaces, or by tilting the chuck, convex or concave surfaces can be finished to an extremely fine degree of accuracy and finish. The wheel spindle is driven by vee belts from a 15-hp motor. The table slide is hydraulically operated and reversals are controlled by Micro-Switches. An adjustable wheel dressing diamond is mounted in the grinding pan.

In the model F-12 in. rotary surface grinder the wheelhead is slidably mounted on a vertical column. Both hand and automatic down feeds are provided, these being made by a pawl and ratchet device operating a lead screw. The wheel spindle is mounted in anti-friction bearings and driven by vee belts from a five-hp motor. Grinding is done by the periphery of a 14 in. diameter wheel. A concentric line finish is produced on the work. The 12 in. diameter electro - magnetic chuck is mounted on a table, slidably operated by a rack and pinion from a reversing mechanism. The chuck is mounted on a short spindle running in taper roller bearings. Both chuck and table are driven by separate Reeves drives. The chuck can be tilted for grinding convex or concave surfaces.

Model EG-103 external cylindrical grinder can be converted to an internal grinder by exchanging the wheelheads. This machine is designed especially for small work although having a diametrical capacity of three in. The table is hydraulically operated.

In operation will be a semi-automatic model D hydraulic rotary surface grinder tooled for grinding steel clutch disks in a complete grinding cycle. The machine is a conventional model with a ram type wheelhead and a vertically movable knee or slide on which is mounted a rotatable electro-magnetic chuck of special design.

A work piece is manually loaded into a recess in one arm of a carrier. Pushing a button starts a grinding cycle comprising indexing the carrier 180 deg to a position over the chuck, lowering the piece on to the chuck, the carrier continuing to move below the work. The chuck switch is automatically closed (and opened), the wheelhead is moved and stopped at a position with the wide wheel over the work. Grinding is done by the plunge cut method, without wheel oscillation. The work slide is moved up hydraulically with a fast approach to the work, next a slow grinding feed, to a positive stop for a spark out. Next the work slide is lowered, the wheelhead moves back, the carrier moves up and by the slight overhang of the work on the chuck, lifts the piece and indexes to the unloading position.

Circle 95 on postcard for more data

CINCINNATI GILBERT MACHINE TOOL CO.

Booth 816

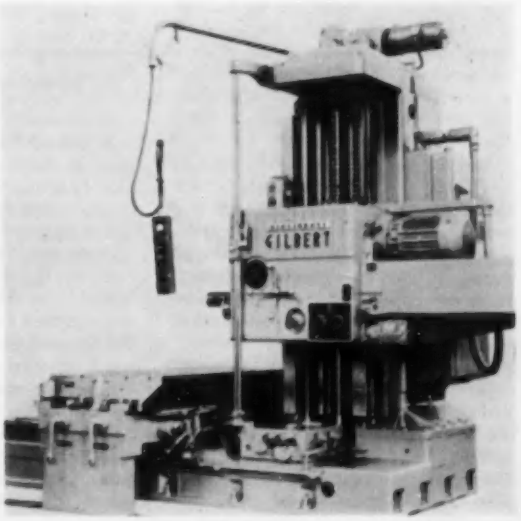
Machines to be on show at this booth include:

A 4½ in. diameter spindle compound table type horizontal boring, drilling, and milling machine equipped with power preselective feeds and speeds. It also has directional control of movements to all units, control of power rapid traverse, control of spindle from a pendant push button station. The machine is also equipped with automatic positioning to head and table which is also controlled from push button stations; saddle supports and under the floor runways.

A Radial Drilling machine with three-ft arm and nine-in. column, with automatic tapping reverse and twelve spindle speeds in a 40 to 1 ratio. It is a light duty three-hp model with automatic tapping reverse, counterbalance, and safety elevating nut and screw.

A 50 in. diameter revolving table equipped with power rapid revolving and accurate dial indicator indexing, and a 22 by 22 by 22⅝ in. high universal table.

Circle 98 on postcard for more data



Cincinnati Gilbert horizontal boring, drilling and milling machine.

CLEARING MACHINE CORP.

Booth 716

Clearing will have on display seven presses which will include both OBI and straight sides, mechanical and hydraulic drives, and single and double action slide motions.

The heart of the recently announced Clearomatic press is its clutch. It provides a mechanical means of changing the speed of rotation of the drive shaft while the press is cycling. During the working stroke, the press is operated in low speed. During the return stroke and the approach, the press is shifted to high speed. As a result, a Clearomatic press is able to operate at twice the productive speed of standard equipment without exceeding the critical punch speed limitations of the material being worked.

An oscillograph will be connected to the press to record the motion and speed of the slide, shown on a large television screen.

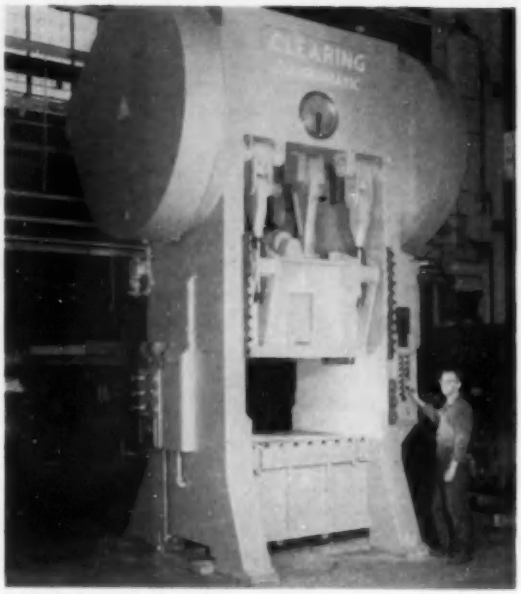
The Clearomatic clutch can be adapted to many types of single and double action presses both underdrive and overdrive. Because of practical limitations of the size of equipment to be displayed, it is shown on one of the smaller lines of Clearing double action presses, the SDA. This is a crank type press with simplified and compact blankholder linkage.

The F type is a single action straight side press with eccentric gear drive, plunger guided. The press on display has all electrical and pneumatic controls built into compartments in the frame. It is equipped with the newly developed hydraulic safety overload protection. This device, completely contained within the slide, provides a hydraulic cushion under the adjustment units. Should an accidental overload occur beyond a preset tonnage, the hydraulic units will give way and avoid either damage or sticking the press.

The S type press is a twin geared, two point crank shaft design. All electrical and pneumatic controls are completely enclosed within the press frame. The drive gears are also enclosed within the crown weldment. It is equipped with a completely automatic circulating oil lubrication system.

The H type single point hydraulic press will be operated under load. Transparent cover plates will expose the operation of the various limit switches and adjustment settings. Electrical controls are completely built into the press frame. The hydraulic circuit features an intermediate prepress slide motion. Beginning at top stroke, the slide approaches rapidly in free fall. At a set point the prepress phase begins applying a low tonnage at a fast slide speed. Still lower in the stroke, the press phase is begun, the slide slows down and applies full tonnage. The upstroke is quickly accomplished by separate pullback cylinders.

The P type press has been especially designed to the specifications of automotive manufacturers. It is a gap frame press with a front back drive, with all drive mechanisms and controls completely enclosed within the frame.



Clearomatic press with two-speed planetary gear clutch is said to triple the speed of the slide during upstroke and approach portions of cycle. This is twin-geared, double crank, double action press with enclosed linkage.

The line of versitile horning presses will be represented by a 75 ton model. It will be equipped with a pneumatic clutch.

The operation of HiProDraw presses will be demonstrated by a plastic working model. This press provides a greatly accelerated stroking rate on bottom drive, double and triple action designs. Similar in effect to the Clearomatic press, the HiProDraw uses mechanical linkage to accelerate the non-working portions of the stroke.

Working models and cutaway drawings will clearly illustrate the six types of pneumatic press clutches.

Circle 99 on postcard for more data

BUFFALO FORGE CO.

Booth 610

A new hydraulic device for adjustment of the top roll on vertical pyramid bending rolls, and a new size drilling machine will be demonstrated.

The hydraulic feature permits quick adjustment of bending rolls with very little effort. A valve handle is placed next to the drum controller so that moving the handle upward will cause the top roll to move accordingly upward. Depressing the handle will cause the roll to move downward. Upon releasing the handle, the hydraulic unit stops instantly and locks the roll into operating position. This permits quick opening of the rolls for the removal of finished work or partially bent work without the necessity of running it all the way through the rolls. Work may also be inserted between the rolls in the open position so that bends can be made at the center of long tangent ends.

The R.P.Mster Drilling Machine with new variable speed drive has a capacity of one in. in cast iron and ¾ in. in mild steel. In the new model all drive gears have been eliminated, and speed changes are made within two speed ranges. Moving a speed control lever on the left side of the drill head housing shifts from one range to another without back gearing, while a crank on the right adjusts to the desired speed within each range.

Circle 100 on postcard for more data

FOSDICK MACHINE TOOL CO.

Booth 1402

Several new machines are to be available, including a jig grinder and a jig borer each with automatic positioning, two radial drills, a radial drill layout machine, and three sensitive drills.

The Moore-Fosdick jig grinding machine combines the Moore jig grinding head with the Fosdick automatic positioning table. A special feature of the machine is its ability to grind cylindrical and tapered holes, with taper in either direction. An angular and indexing device built into the main spindle, and the newly developed slot grinding attachment, permit the quick, accurate grinding of any contour—regular or irregular. The machine has an infinite range of grinding speeds from 12,000 to 60,000 rpm.

Measurements are made by setting dimensions from the blueprint on direct-reading drum dials, one for longitudinal, the other for transverse position. Numerical dials are claimed to minimize errors. Class "A" gages, permanently sealed against dust and never handled by the operator, provide consistent precision. Accuracy is not dependent upon screw threads of any kind. Once dials are set, the positioning button is pressed. Table and saddle will automatically position themselves to the dimensions set on the dials.

The jig borer, in addition to having the same positioning system, also features the anti-friction quill, made of hardened Nitralloy steel and mounted in two sets of ball races containing 900 preloaded precision balls. This new design places ball races in bushing permanently located at the top and bottom of the head. Thus ball-quill contact is constant at these points, whether quill is raised or lowered. Maximum support is given to the spindle, and friction between quill and head casting is minimized.

Sixteen spindle speeds from 30 to 1800 rpm are offered, as well as eight feeds ranging from 0.0005 to 0.010 ipr. Dial selectors at the push button station enable the operator to preselect the feed and speed of the next operation while the machine is running. Push button changing of feeds and speeds is made possible by the use of powerful multi-disc clutches. All sliding gears, shifter forks and mechanical linkages have been eliminated.

The bed on the Fosdick Jig Borer is exceptionally wide to give maximum support to the table and saddle. Leveling screws provide a three-point support. Ways are V and flat design with the V sides close together to eliminate misalignment caused by temperature variation. V-ways are at the center and extend back under the column for maximum resistance to deflection. Non-influencing locking clamps are provided to lock table and saddle in place after positioning. All ways are lubricated by a one-shot oiling system and protected by guards and wipers. Two table sizes are available—22 by 44-in. and 22 by 54-in.

Sensitive radial drills combine the features of the upright and sensitive drills—rigidity, compactness and convenient table height—with the capacity and flexibility of the radial. The machine has a fixed-height arm which can be swung 360 deg, and an adjustable-height table which also swings 360 deg. Work can be placed either on the table or the base.

This machine has nine speeds, four feeds and a three-hp motor. Spindle speeds range from 60 to 1200 rpm or from 175 to 3500 rpm, controlled by a direct reading lever. Feeds range from 0.004 to 0.020 in. or from 0.002 to 0.010 in. All gears are made of alloy steel, heat treated and shaved. They slide on ground splined shafts which revolve in anti-friction bearings. A convenient control reverses the motor for tapping.

Another new Fosmatic radial drill features pre-selected feeds and speeds and 36 spindle speed choices up to 3000 rpm. Speeds and feeds are selected, usually while waiting for a drilling operation to be completed, on dials at left side of head. Shifting is accomplished by raising the spindle control lever slightly in its neutral position. Feed is engaged through a magnetic clutch simply by pushing a button on either quick-return lever, disengaged either by depth control or pushing one of the buttons. The spindle can be stopped, started or reversed without engaging the pre-selected speeds or feeds. Spindle reverse speed is 40 per cent faster than forward speed to make tapping more efficient. The feed dial is graduated to full spindle travel to eliminate resetting of dial for deep holes.

Spindle and quill have been made heavier than on previous models, and the new spindle bearing mounting brings the bearing closer to the spindle nose for greater rigidity in boring and heavy drilling. An entirely new arm design is claimed by the company to be at least twice as strong as that used previously. The entire head, including ways, is automatically lubricated. The head is mounted on adjustable roller bearings, on hardened ways, with an additional roller support in back of the arm.

The new sensitive radial drill layout machine can also be used as a radial drill. The new layout machine combines a high-precision jig borer table with the sensitive radial drill. V and flat construction with a screw in the center of the V moves the table accurately across the knee. An outboard support is used. The 24 by 42-in. table has a movement in and out of 18 in. Measurements are made to the table by means of a graduated dial connected to the precision screw. A scale is also provided to give rough measurements. Length measurement is achieved by moving the head along the arm with the reading taken from a graduated dial on the traverse bracket.

The company will also exhibit three sensitive drills—two single spindles, 1½ hp and three hp—one four-spindle machine, 1½ hp per spindle. These machines are available with six or nine spindle speeds, 55 to 900, 110 to 1800, 225 to 1800 or 220 to 3600 rpm.

Circle 101 on postcard for more data

LAKE ERIE ENGINEERING CORP.

Booth 1310

One of the fastest double action hydraulic presses ever produced will be on display. Originally designed for an automotive parts manufacturer, the 18½ ft high press is a compact, self-contained unit, combining a 150-ton clamp slide with a 150-ton draw ram. This double action is implemented by a 75-ton hydro-pneumatic cushion assembly which is used to produce deep-drawn parts.

Physical characteristics include a 40 by 40 in. bed area, 30 in. draw stroke, 18 in. clamp stroke, and six in. cushion stroke. Specifications include rapid, accurate adjustable pressure controls for all actions, including individual control of the four clamp cylinders. Single cycle or continuous operation can be quickly set by a selector switch, and all actions are positively controlled by pushbutton.

Operating on 270 hp, the press approach and return speed is 2000 ipm while the draw stroke is made at a maximum 460 ipm. Equipment of this design is now in operation producing 1260 deep-drawn stainless steel pieces per hour.

Circle 102 on postcard for more data

GOULD & EBERHARDT

Booth 1424

The 10HQ HoBlique, a new helical gear hobbing machine of compact design and high-speed for mass production, will be exhibited. Key feature is the feeding of the hob tangent to the helix of the gear being cut with either of two basic cutting cycles available. One uses a Trihineal feeding cycle which provides three feed rates in series, two successive fast enter feeds at different rates followed by the hobbing feed. The other comprises a Quadricycle with a fast enter infeed followed by the hobbing feed tangent to the helix. The hobber can be fitted for automatic loading.

The hydraulically operated hobbing feed, being in the direction of the helix angle, requires no lead screw, differential or lead cam, or lead and feed change-gears. Hob wear is distributed over the entire length of hob; consequently, no shifting of hob is needed, nor are long hobs or tapered hobs required. The machine will take high speed hobs up to 550 rpm. Capacity is 2¾ to 10 in. diameter, 8 to 14 NDP with six-in. maximum face.

Radical improvements are said to be incorporated in the new line of shapers. They feature a solid top ram, hard-chrome ram V-ways, and an electric clutch and brake. The slot in the ram has been eliminated, and the ram reinforced and stiffened with both a longitudinal rib and heavier crossribbing to strengthen the entire structure. Deflection has been reduced to a minimum. For more convenient operation, a separate and positive ram lock has been brought forward adjacent to the ram positioner. The new ram lock operates on the screw-and-jamnut principle; it effectively eliminates any tendency to distort the ram. Cutting forces are transmitted directly by the enlarged positioning screw.

A 72S gear cutting machine, one of a new series of large disk-type gear cutting machines for spur gears and sprockets, will be shown for the first time. These machines were developed to satisfy the need for rapid and economical production of large-diameter and coarse-pitch spur gears.

The machines operate on the vertical cutting principle, with the stanchion adjustable for various diameter gears and depths of cut. An automatic cutting cycle comprises feed of cutter, rapid return of cutter, and indexing of work for each tooth.

High speed universal gear hobbing machines for spur gears, single- and double-helical gears, spline shafts, and sprockets operate at hob speeds from 90 to 550 rpm or 65 to 400 rpm. These speeds permit economical operation with regular high-speed steel hobs at surface speeds of 300 fpm or more. The machines are powered by 25 hp and 30 hp motors.

The stanchion is built unusually deep for rigidity, and is adjustable for various diameter gears and depths of cut.

Circle 103 on postcard for more data

WYSONG & MILES CO.

Booth 913

No. 1025 power squaring shear, weighing 11 tons with a 10-ft cutting length and a capacity up to ¼-in. mild steel will be exhibited. This unit has an automatic lubrication system, ball-bearing back gage, and air-trip operated clutch. No. 748 shear weighing 5¼ tons, features an air clutch, air brake, air trip, automatic lubrication, and finger guards on the holddown. This unit shears up to four-ft lengths of 3/16-in. mild steel at a rate of 200 strokes per minute, or by setting the non-repeat control, it operates single stroke. The air clutch is designed to compensate for wear and automatically halts the knife bar if overloaded. No. 1472 power squaring shear, weighing 2½ tons, has a cutting length of six ft and a capacity of 14-gage mild steel. Its equipment includes a light gage, cover for cored pockets in table, ball-bearing precision back gage, and a one-shot lubrication system. This model is similar to the No. 1272 which has rubber holddown feet and a special rake of the top blade for shearing plastics and composition material. Also on display will be the No. A-72, air-powered unit, which will cut 16-gage mild steel in lengths up to six ft.

Circle 104 on postcard for more data

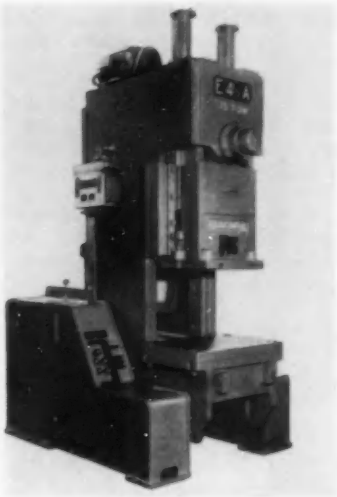
FERRACUTE MACHINE CO.

Booth 702

A new 200-ton open back inclinable press (CG 37½) with box type ram counterbalanced, has as standard equipment, the new air-powered, electrically controlled friction clutch with interconnected brake and single point adjustment. The friction clutch with interconnected brake provides a quick and extremely accurate control for punch presses requiring start-stop operation. Design of the interconnecting assembly permits quick, simple, positive single-point brake adjustment. It meets JIC standards.

The same box ram open back inclinable press in 110- and 150-ton models is also available. All three are designed for cutting, punching, stamping, shallow drawing and forming operations. These presses will accommodate any type automatic or semi-automatic feed attachments. For completely automatic operation, single or double feed rolls, ratchet-dial, friction dial, magazine or chute feeds may be combined with a hopper, lower cam or crank knock-up and inspection station. Model C Dayton-Rogers bed-mounted die cushion can be installed for drawing medium gage metal. The new box type ram is a high tensile semi-steel casting. A bar type knock-out may be accommodated. All three presses have automatic lubrication.

Circle 105 on postcard for more data



Niagara front-to-back inclinable press equipped for automation.

NIAGARA MACHINE & TOOL WORKS

Booth 715

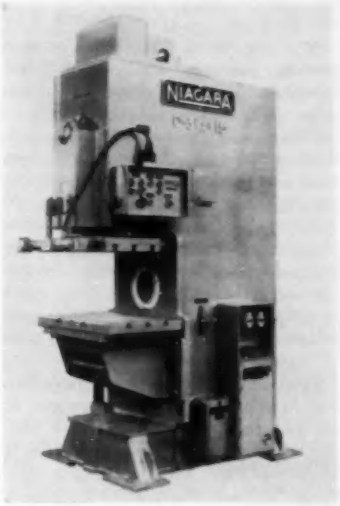
Niagara will conduct a great mass demonstration of "What's New in

MINSTER MACHINE CO.

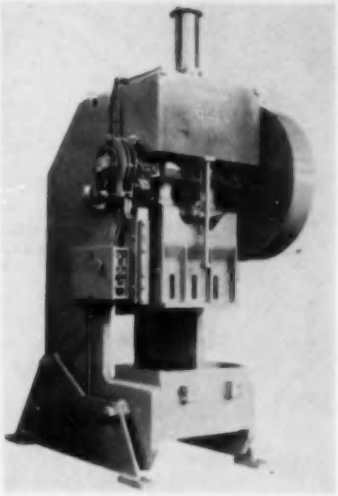
Booth 1410

Several new presses will be presented. The No. 4 OBI press features an enclosed frame top and main bearings. It uses the combination air friction clutch and brake, and has centralized controls.

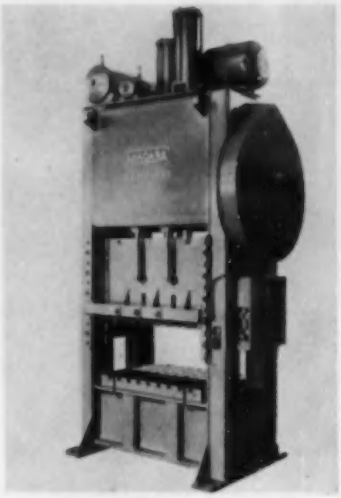
The P2 45-ton straight side two



Niagara adjustable bed press equipped for automation.



Niagara double crank OBI press.



Niagara straight side double crank press.

Metalworking" at the Machine Tool Show, according to company officials. Spearheaded by a brand new line, the front-to-back crankshaft inclinable press, and latest developments in modern press automation, the Niagara exhibit-in-action will unveil up-to-the-minute developments in presses, shears, machines and tools for plate and sheet metal work. These will include straight side eccentric geared presses, straight side double crank presses, power squaring shears, single and double crank open back inclinable presses, front-to-back crankshaft adjustable bed horning presses, press brakes and bending rolls.

Circle 106 on postcard for more data

point press is designed for automatic production. It offers a new shaper-motion feed drive, running in oil. Feed length may be adjusted while the press and feed are active. Piping and wiring are enclosed, and the press is shipped ready to operate.

The G1 110-ton portable gap press will be shown, featuring the clutch-brake combination, long barred-type slide adjustment, and enclosed plumbing.

The MS2 150-ton straight side twin drive press meets JIC standards. Auxiliary equipment is enclosed within the frame line of the press. The portable press requires no pit, and is said to be ideal for use with automation equipment.

Circle 107 on postcard for more data

EDLUND MACHINERY CO.

Booth 115

On display for the first time will be the model 4F drilling and tapping machine for continuous heavy duty production work and the model 1F sensitive drilling machine for light precision work. Added to the present model 2F, these two new models provide a complete range from light to heavy drilling and tapping requirements.

Model 4F features infinitely variable speeds to 2200 rpm and a capacity in cast iron of 1½ in. Designed primarily for heavy duty drilling and tapping operations on a continuous production basis, it has a 12-in. overhang with pedestal; models are available in 1, 2, 3, and 4 spindles.

The model 1F sensitive drilling machine features an infinitely variable speed drive with instant selection of any speed between 1250 to 10,000 rpm. An optional range of 625 to 5000 rpm is available. Other precision operating features on the model 1F are a prepositioned micrometer graduated depth gage for controlling drill penetration, and an adjustable spindle tension control to give the operator the exact feel when drilling different materials. The Model 1F has a seven-in. overhang, ⅝-in. capacity in cast iron, and is available in 1, 2, 3, 4, and 6 spindle bench and pedestal models.

Circle 108 on postcard for more data

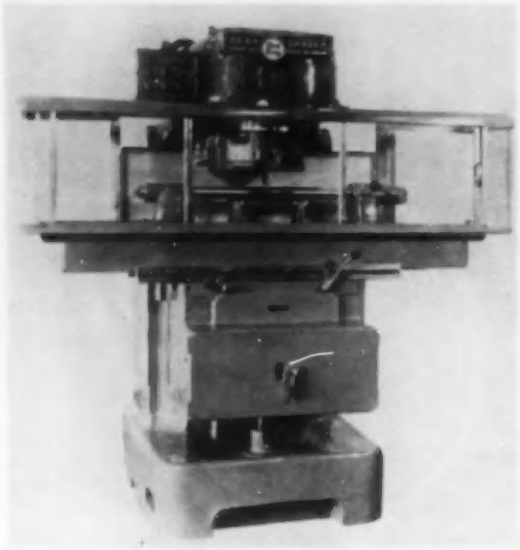
RIVETT LATHE & GRINDER, INC.

Booth 805

A new principle of armature turning is employed in a lathe designed solely for armatures of small fractional horsepower motors. Model 1AL turns the commutator while the armature revolves on its own axis. The armature mounts on two supports and is rotated on its own shaft by the friction drive of a revolving belt. By rotating on a parallel axis, the commutator of the armature is turned to true concentricity. The armature revolves under the same conditions as when rotating on its own bearings.

Depth and length of cut are automatically controlled with a power driven tool slide duplicating size on each piece. Tolerances are held on duplicate work to 0.0005 in. Smooth finish is obtained by rotating at speeds up to 7000 rpm, suitable for diamond or carbide-tipped tools. Established production time per piece in turning ⅝ in. length of commutator surface is 11 seconds from tray to tray.

Circle 109 on postcard for more data



Red Ring model GCU 12-in. external gear shaving machine with long table.

NATIONAL BROACH & MACHINE CO.

Booth 1215

A complete gear shaving and inspection department in full operation, handling a variety of internal and external helical gears, will be featured.

The latest models of external and internal gear shaving machines, automatic loading devices, gear speeders, gear nick testers, gear checkers, gear rolling fixtures, automatic gear gaging and sorting machines, and air-powered broaching fixtures will be shown.

A Red Ring model GCU- 12-in. external gear shaving machine, equipped with an automatic loader and automatic differential upfeed mechanism, will shave an automotive transmission cluster helical gear.

A model GCU 8-in. external gear shaving machine, equipped for semi-automatic loading with automatic differential upfeed, will shave an automotive transmission clutch gear.

Model GCU 12-in. external gear shaving machine, equipped with a special long table and automatic differential upfeed mechanism, will shave a seven-in. wide helical gear with integral shaft 24 in. long. Model GSC 10-in. gear nick tester will be nick testing an automotive automatic transmission helical gear. Model GRD automatic gear gaging and sorting machine will check and sort small automotive automatic transmission helical pinions automatically for tooth size accuracy.

A new self-contained air-powered broaching fixture will broach small parts economically at high production rates.

Also on display will be the model GCR 12-in. internal gear shaving machine, model GSD 14-in. internal gear speeder, model GSC 10-in. gear speeder, model SIC 12-in. gear checker and a standard gear rolling fixture for internal gears.

Circle 110 on postcard for more data

REID BROTHERS CO.

Booth 108

The new line of 6 by 18-in. precision surface grinders will be exhibited. Model 618-PF is a fully electric powered, push-button automatic grinder of heavy construction for use in production line or tool room grinding. Dial controlled speed of the table is infinitely variable from zero to 70 fpm. Table reversal is accomplished without reversing the driving motor. Cross-feed drive is dial controlled for infinitely fine adjustments from 0.001 to 7/32 in., and a selector switch controls cross-feed at either or both ends of the table travel.

Power rapid traverse of the cross-feed, elevating head, and automatic cycle of the cross-feed are push button controlled. The grinding head is newly designed with adjustable gibs. Cross-feed screw and elevating screw have ground threads. Automatic lubrication to all way surfaces operates continuously, and constantly rotating and moving parts are mounted in one transmission and continuously splash lubricated. Dust guard protection is provided for all way surfaces.

Circle 111 on postcard for more data

BRYANT CHUCKING GRINDER CO.

Booth 1015

Among the various machines shown will be the model 998 precision boring machine, tooled to turn, bore, chamfer and face clutch collars. A cross slide is used to generate the gear faces with single point tools. A dial type boring bar is provided. A low pressure coolant system is used. The machine produces 80 parts per hour at 100 per cent efficiency, boring a 1.740-in. hole 0.338 in. long, boring a 5.69-in. hole ⅜ in. long, turning a 2.128-in. diameter 15/32-in. long, facing two faces and chamfering, to a finish of 63 microinches. A similar machine will be deep-hole drilling piston pump rods.

Straight bore grinding will be done

DEVLIEG MACHINE CO.

Booth 1317

Two new Jigmil precision boring and milling machines will be exhibited. Model 2B-36 Spiramatic Jigmil, has been designed to meet an increasing demand for a smaller size machine for jigless boring production parts and machining jigs, fixtures and experimental parts. It will have a 2½-in. diameter spindle bar with No. 40 NMTB taper, 12 in. bar feed, 24 by 36 in. table, 36-in. horizontal travel and 24-in. vertical travel. This machine will be equipped with automatic positioning to horizontal and vertical slides, power-operated tool lock mechanism and a new type of index table for jigless boring of repetitive parts from several sides.

The company will also exhibit a model 3B-72 incorporating various important design improvements. Both machines will be operating under power on actual machining operations. It will also exhibit a comprehensive range of Microbore precision tooling. This is a multi-purpose single-point, adjustable tool with micrometer vernier adjustment which may be applied for all types of precision boring, turning and facing operations.

Circle 112 on postcard for more data

on a model 3216 automatic internal grinder. Colored lights will show the cycle of operation.

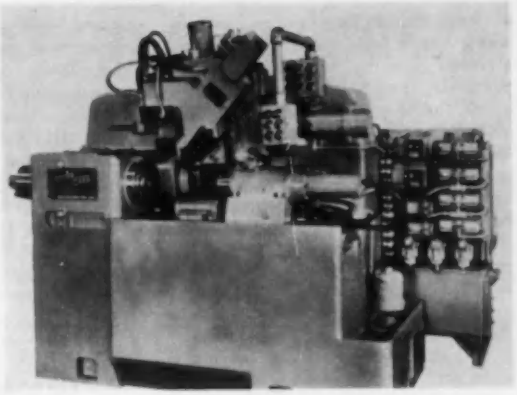
Combined boring and face grinding will be demonstrated on a model 1316-J hydraulic internal grinder, at a single chucking. Fine finish and accuracy will be demonstrated grinding the bore in ring gages on a model 1116-X hydraulic internal grinder. Automatic grinding of tapered bearing cups will be demonstrated on a model 1209-Y machine, hopper fed with a shoe centerless fixture and magnetic driver.

Circle 113 on postcard for more data

OHIO MACHINE TOOL CO., HYDRA-FEED MACHINE TOOL CORP.

Booth 301

Two new products to be shown by Ohio Machine will be a No. 415 quick change drill, and a compound table. The drill has 1½-in. capacity in mild steel. The spindle is guided by a slide on the frame, giving full support for the 12 in. of travel. The 14 by 30-in. table can be used on any of three models of Defiance quick change drilling machines.



Hydra-Feed tracer lathe.

Hydra-Feed will show a new tracer lathe, with the top tracer, in production on automotive forgings. A standard automatic chip removal unit will be used to remove chips through the opening provided in the rear of the lathe bed. This unit plus the full width, full depth chip chute demonstrate, that even with its high rate of metal removal, chips are no problem. Location of the tracer slide and the template on the top carriage does away with the possibility of dirt and chips interfering with maximum lathe efficiency.

For the machining operation the Hydra-Feed lathe will be equipped with an auxiliary carriage to perform an additional facing operation. This auxiliary carriage may be used for facing, grooving, chamfering, or any type of cut that can be handled by a straight plunge operation. In addition, auxiliary tooling can be supplied to permit contour facing and turning.

Circle 114 on postcard for more data

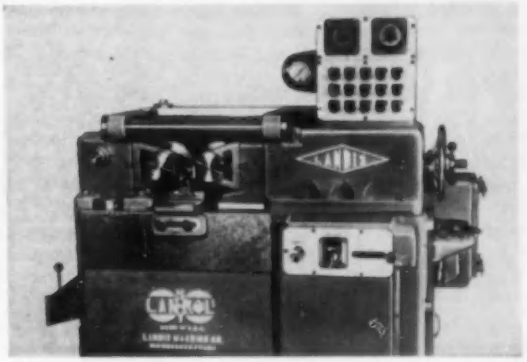
LANDIS MACHINE CO.

Booth 1406

The Lanhyrol thread rolling machine is designed for production of accurate threads in a chipless cold forming process. It features a two roll (cylindrical thread die) design with the work blank supported in position between the rolls on a workrest blade or holding fixture. With suitable rolls the machine can produce 3/16 to three in. diameter threads of all types, left or right hand, with the exception of square threads and threads of high taper. Hopper and magazine feed are available for parts of less than seven in. overall length.

Infeed rolling can be accomplished manually or automatically through the use of rolling and loading timers. Through-feed rolling is used when producing threads longer than 5⅞ in. Continuous rolling provides the highest rates of production for workpieces ¾ in. or less in diameter with a maximum overall length of seven in. and of medium hardness. Reciprocal rolling is designed for producing coarse pitch threads on materials of relatively high hardness such as worms or helical gears.

The two thread dies are mounted on parallel horizontal spindles which are power driven. One roll and its spindle rotates in a stationary bearing support. The opposing roll and spindle unit rotates in a movable bearing support housing, controlled by variable hydraulic pressure. This movable unit is controlled by timers and can be operated either manually, semi-automatically or automatically. A handwheel allows an infinite to ¾ in. maximum stroke adjustment to facilitate loading and unloading. Changes in workpiece diameter are by a size adjustment screw which adjusts the movable spindle housing. A two-speed 7½ hp motor delivers power to the gear box.



Lanhyrol thread rolling machine provides four methods of rolling

Model C Landmaco threading machines will be available in five sizes and in double and single spindle models, with or without lead screw feed, for No. 4 through 2½ in. threads. Either a Lanco hardened and ground or heat treated threading head may be applied to these machines. The hardened and ground head is recommended where extreme thread accuracy is required; the heat-treated head where wide range and maximum economy are prerequisites. Both types are equipped with tangential chasers. Each machine features an eight or nine standard spindle speed range. Higher and lower speed are available.

The machine beds are equipped

with replaceable hardened and ground ways. Other features include a large screened opening over the coolant reservoir, ample chip space, large doors for chip removal from either side of the machine, and a wide drip ledge around the bed. Starting, jogging, stopping and spindle direction or rotation control are accomplished by an electrical push button station. The station, mounted on a pivot arm, may be moved to either side of the machine.

In addition, an automatic nipple threading machine with hopper feed, a 32C threading machine for heavy duty precision work and a No. 1 centerless thread grinder will be in operation. A complete line of threading tools, including heat-treated, hardened and ground die heads, collapsible and solid adjustable taps, and the new Lanroll thread rolling attachment will be on display.

Circle 115 on postcard for more data

KENNAMETAL INC.

Booth 123

Grade K21, a new general purpose steel cutting tool material, and a new line of Kendex metal cutting tools, will be highlighted. The multi-purpose sintered carbide material was designed to increase productivity on both high and low production machines through wide ranges of application. With a Rockwell A rating of 91.0, the carbide was specifically engineered for general cutting, heavy roughing and finishing of steel products. Characteristics are said to be high edge-strength, superior wear quality and resistance to cratering, according to company reports. The firm will also display 17 styles in a range of sizes in Kendex tooling. Kendex button tools, with turnover-type throwaway inserts, feature a new chip control system with replaceable chip breakers, multiple-edge quick indexing inserts, interchangeable parts, elimination of grinding, longer tool life, economy and a wide range of styles which provides a simple system of maintaining inventory. A new series of Kendex tools with positive rake will be introduced at the show.

A tool grinding service and a demonstration comparing steel and Kennametal machine parts are also scheduled.

Circle 116 on postcard for more data

HARTFORD SPECIAL MACHINERY CO.

Booth 201

Featured items will include the newly acquired line of automatic hydraulic controlled drill units which provide unusual flexibility. There is a newly designed No. 40 and No. 60 automatic cam feed drill unit which provide faster cycling by means of an electric clutch, and No. 405 and No. 410 hydraulic feed units which provide up to 28,000 lb thrust and 30 hp for driving large multiple spindle heads.

The display will include operating units and a plastic demonstrator model of the hydraulic drill unit, an operative No. 405 hydraulic feed unit and models of the No. 40 and No. 60 automatic cam feed drill units with plexiglass covers for observation of working parts. The Super-Spacer will also be shown.

Also to be introduced for the first time will be a newly developed lead screw tapping unit which incorporates rapid traverse and return. This new unit, actually a modification of the air-hydraulic drill unit, illustrates how it is possible to quickly convert the drill unit into a precision lead screw tapping machine. Also illustrated will be the new automatic thread rollers with rotary hoppers, as well as die polishing machines.

Circle 117 on postcard for more data

DENISON ENGINEERING CO.

Booth 819

The Multipress and a varied line of precision-built pumps, motors and controls—will be in actual operation.

Operating equipment will include: a 50-ton press with index table, a four-ton D frame Multipress, an eight-ton F frame Multipress with servo control; a 15-ton press with index table, and a four-ton stock-feed operating press. A four-ton D frame press with index table and a four-ton Multipress with automatic controls will also be on exhibit.

Denison Multipresses feature manual or automatic control, touch control for applications requiring individual control of ram speed and pressure; vibratory ram action, hydraulic interlock, adjustable speeds and ram reversal adjustment.

The 50-ton Multipress with index table regulates ram movement from fast approach to controlled pressing speed at any desired point during downward travel, permitting speed during the non-working portion of the stroke cycle. Hydraulic production accessories can be incorporated and controlled through the valving of the press system, providing positive synchronization of movement and efficiency of operation. The press is equipped with index tables of either six or twelve stations.

Circle 118 on postcard for more data

GISHOLT MACHINE CO.

(*Continued from page* 114)

Superfinishers:

The No. 52A General Purpose: Readily adjustable automatic cycle for job lot work. Demonstration on turret locking pins bring cylinderical surface finish down to 5 micro inches in less than .5 minutes floor to floor time.

The No. 54 Two Spindle Machine: Setup on two different automotive transmission parts. Operator merely loads and unloads. Resultant finish eliminates any oil seal leakage due to excessive surface roughness. High production rate.

The No. 79 Bearing Race Machine: High production setup for inner and outer roller bearing races, resulting in better finish in less time. Single machine handles extremely wide variety of sizes and styles.

The No. 81 Valve Tappet Machine: New model, single spindle machine, arranged with automatic cycle. Groups of these machines readily adaptable to varied production requirements, either with or without full automation.

The No. 3 Attachment: Display unit showing one of four sizes. Attachment ideal for occasional job. Mounts right on existing lathe in shop and saves cost of a special machine.

Dynetric Balancing Machines:

The 1SB Bench Model: Automotive transmission part, with correction plane outside the work supports. Force-Moment setup to correct for static and check for dynamic balance. Integral drill makes correction in units read directly from meter.

The 31S Floor Model: Two sets of work supports permit handling wide variety of work. Demonstration rotor 6 in. diameter, 28 in. long. Shows

ability to read exact amount of correction required in each of two selected planes, to give proper dynamic balance.

The 1SV1 Vertical Model: High production setup on automotive clutches. Static unbalance quickly located and measured. Correction drill unit incorporates automatic chip removal and permits testing for accuracy. New vertical model speeds all handling operations.

The Type 4U Floor Model: New machine demonstrated with 645 lb test rotor operating at 300 rpm. Unbalance causing movements of as little as 25 micro inches at the bearings can be quickly measured and located. Machine has 50 per cent greater swing capacity for workpieces.

Circle 23 on postcard for more data

MONARCH MACHINE TOOL CO.

(*Continued from page* 139)

be positioned crosswise on the platen, perpendicular to the work axis. The rear slide normally is mounted on its ground base at a 90 deg angle to the work center line. The generous size of the base, however, permits this slide to be positioned at any desired angle as required by the particular work piece. The automatic tool relief built into the rear slide may be locked out when operations not requiring this feature are being performed. The tracer slide ways, front slide ways and rear slide ways are flame hardened and precision ground. The Hydra-Slide lathe meets JIC electrical standards.

A four cut fully automatic work cycle, higher turning speeds and greater cutting capacity are features of the new model 21 Mona-Matic manufacturing lathe. The model 21 is heavier and more rugged in construction than previous Mona-Matics. The heart of the multicycle programming control is a special cam stack which dictates the particular operating sequence. The programmer automatically regulates the cutting tools, carriage feed and traverse, the rear slide, and the air gage tracer. Up to six different feed speeds, three rough cuts and one finish cut are available.

Adjustable limit switches mounted on the carriage and actuated by carriage movement provide the electrical impulses required to index. The programmer, together with the electronic components and related cycle control circuits, is housed in a separate control cabinet mounted on the rear of the tailstock leg. Changing from one work piece to another can be readily accomplished by installing a new cam stack in the multicycle programmer and readjusting the position of the limit switches on the carriage. Power is supplied by a 20-hp main drive motor. Direct drive to the spindle is through a hydraulic clutch and brake in the headstock. Interchangeable headstock gearing gives spindle speeds from 164 to 1880 rpm.

The dual template air gage tracer offers template control for the last rough cut and final finish cut, with adjustable stop dimensioning of the first and second rough cuts. Actuation of the rough cut stops and shifting of the template holder are controlled by the programmer.

Circle 119 on postcard for more data

PRATT & WHITNEY

(*Continued from page* 126)

Spindle speeds range from 30 to 1540 rpm in 16 steps. For ease of hand control and sensitivity, regardless of the weight of die block being cut, the handwheels control servo valves which operate hydraulic assists in moving the table carriage.

A new vertical precision hole grinder, designated the No. 2E, is designed to grind straight or tapered holes and radii with extreme accuracy. Grinding speeds range from 4000 to 100,000 rpm. Table working surface is 22 by 44 in. The work is strapped to a table and does not revolve. The grinding wheel has a planetary motion about the vertical axis of the hole being ground and can be fed outward in an increasingly larger radius while the machine is running. This feature—combined with the extremely fast, precise method of positioning the table—makes it possible to accurately locate and grind any number of holes of various sizes in a workpiece without stopping to change the set up. It uses the Electrolimit measuring system.

A new Air-O-Limit automatic machine control gage provides for in-process gaging, and automatic feedback corrections. It allows for step impulse changes to the machine controls for tool resetting to maintain tolerances. Rejects will cause machine to stop.

A four station unit has been installed on a New Britain-Gridley automatic dual boring machine to produce a shoulder bushing. The control unit is an integral part of the boring machine mechanically, electrically and functionally. The automatic cycle for this work piece consists of loading, machining internal and external diameters, and checking to a 0.0003-in. maximum tolerance. The machine is equipped with an automatic feed mechanism, and a production rate of 120 pieces per hour is maintained.

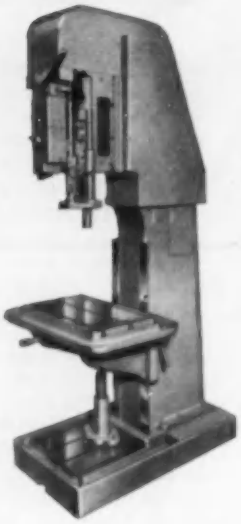
The Potter & Johnson Co. subsidiary of P&W will demonstrate two new automatic turret lathes, the model 4-U and the model 6-DRE-40.

The model 4-U is designed and built specifically to take full advantage of carbide cutting tools. To insure increased stiffness and rigidity, the bed of the 4-U is a heavy steel weldment with ample ribbing. Bed ways are of laminated construction with bearing surfaces of hardened tool steel ground in place on the machine. Guards quickly and easily slide out of the way for setup or loading and unloading. Chuck sizes are 10, 12 and 15 in. Large spindle diameter insures ample rigidity. Mounting is in double Timken bearings front and rear, with the front pair preloaded. Motors from 15 to 25 hp may be specified. There are six automatic feed changes, and four automatic speed changes from 45 to 1177 rpm. An optional two-speed motor can be provided.

The Model 6-DRE-40 automatic lathe offers 40 hp input. Chuck sizes are 18, 24 and 30 in. Construction throughout is extremely rigid. The standard turret has six faces and uses a Geneva type action. Speeds range from 23 to 470 rpm.

P&W has three new rotary tables to display. A 48-in. precision vertical rotary table is designed for inspecting large, heavy workpieces such as aircraft components, machine tool elements, jigs, fixtures and other precision products. It can also be used to provide precise work location on heavy equipment for boring, facing and other machining operations. It is precision hand scraped and fitted, rigidly inspected, and will index accurate to seconds of arc.

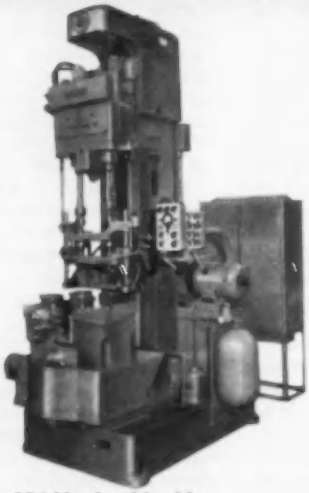
Circle 129 on postcard for more data



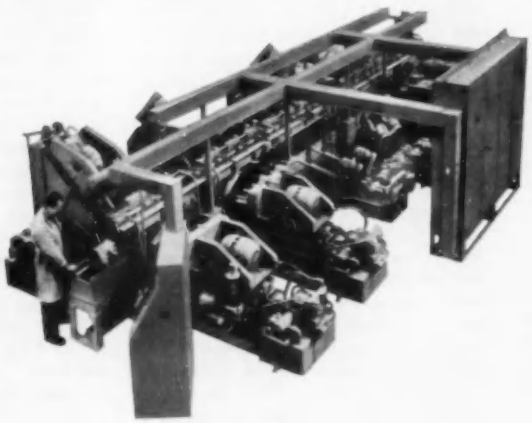
NEW 1½ HP Model S-64 Drilling Machine
Single Purpose, High Production, Hydraulic Feed
1500 lbs. Thrust, ¾" Capacity In Steel.

NEW Model 111 Honing Machine
For Automatic High Production Honing
of Small Size Bores.
Automatic Hopper-Feed and Unload
Plugmatic Sizing, Air-Electric Hone Expansion
Automatic Gaging for Selection of Parts To Be
Honed — rejection of parts unsuited
¾" Bore Capacity x 3" Maximum Length
2" Mechanical Stroke, 6" Lift-Out

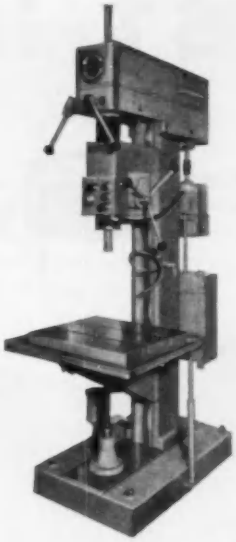
see these BARNESDRIL *machines in action!*



No. 224 Honing Machine
Production Honing Cylinder Blocks
Plugmatic Sizing Electronic Hone Expansion
Sizing within .0005", 20-30 RMS Finish
Removing .002"/.003" Stock
Production Rate 240 Per Hour At 80% Efficiency



Special Unit of 19-Station Transfer Machine
One of 18 Units for Drilling, Milling, Reaming
and Tapping Automatic Transmission Cases
will be in Operation to Demonstrate Production
Rate of 75 Per Hour at 70% Efficiency.



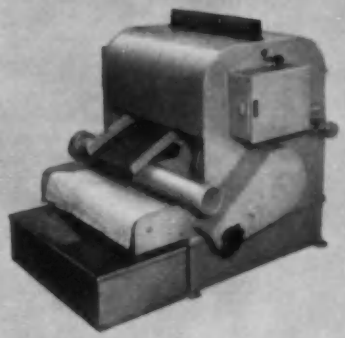
NEW 7/8" High Speed Drilling Machine
7/8" Capacity In Steel
Push Button Feed Engagement
Depth Control with Automatic Feed Trip-Out
Electric Starting Control
Direct Reading Dial for Selecting Depth

Booth no. 818

If you're looking for new ideas, new ways to cut production costs, come to Chicago, September 6-17. Bring your key production people with you. See these machines in operation at our Booth No. 818. Complete information and literature available through our Sales Engineers and Personnel who will be on hand to demonstrate equipment throughout the show.

COOLANT BARNESDRIL CLEANING

FILTRATION DIVISION



KLEENALL Combination Fabric and Magnetic Tank Type Filter.

Magnetic Coolant Separator with Double Cleaning Action.

MOLD BARNESDRIL FINISHING

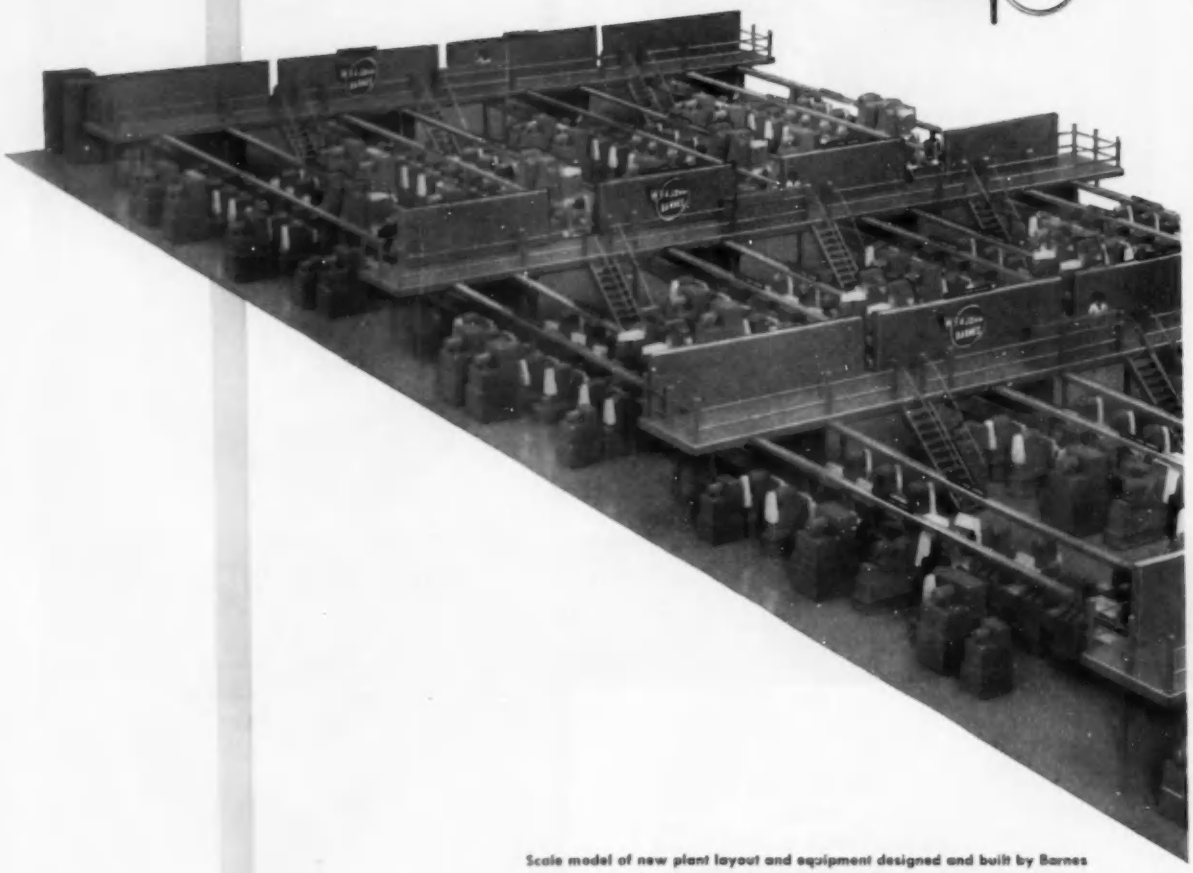
BARNES DRILL CO.

850 CHESTNUT STREET • ROCKFORD, ILLINOIS
DETROIT OFFICE: 3419 SOUTH TELEGRAPH ROAD

SEE THE LATEST in

at booth 1223

THE MACHINE TOOL SHOW



Scale model of new plant layout and equipment designed and built by Barnes for the automatic machining of automobile cylinder heads. Line provides for Automatic Storage Conveyors and Electro-Graphic Maintenance Detector Systems for each section. Estimated total production output is 400 cylinder heads per hour, or 100 heads per hour per line at 100% efficiency.

W. F. & JOHN BARNES

Builders of Better Machines and Equipment Since 1872

Special Machine Tools

Special Conveyor Units

Special Process Equipment

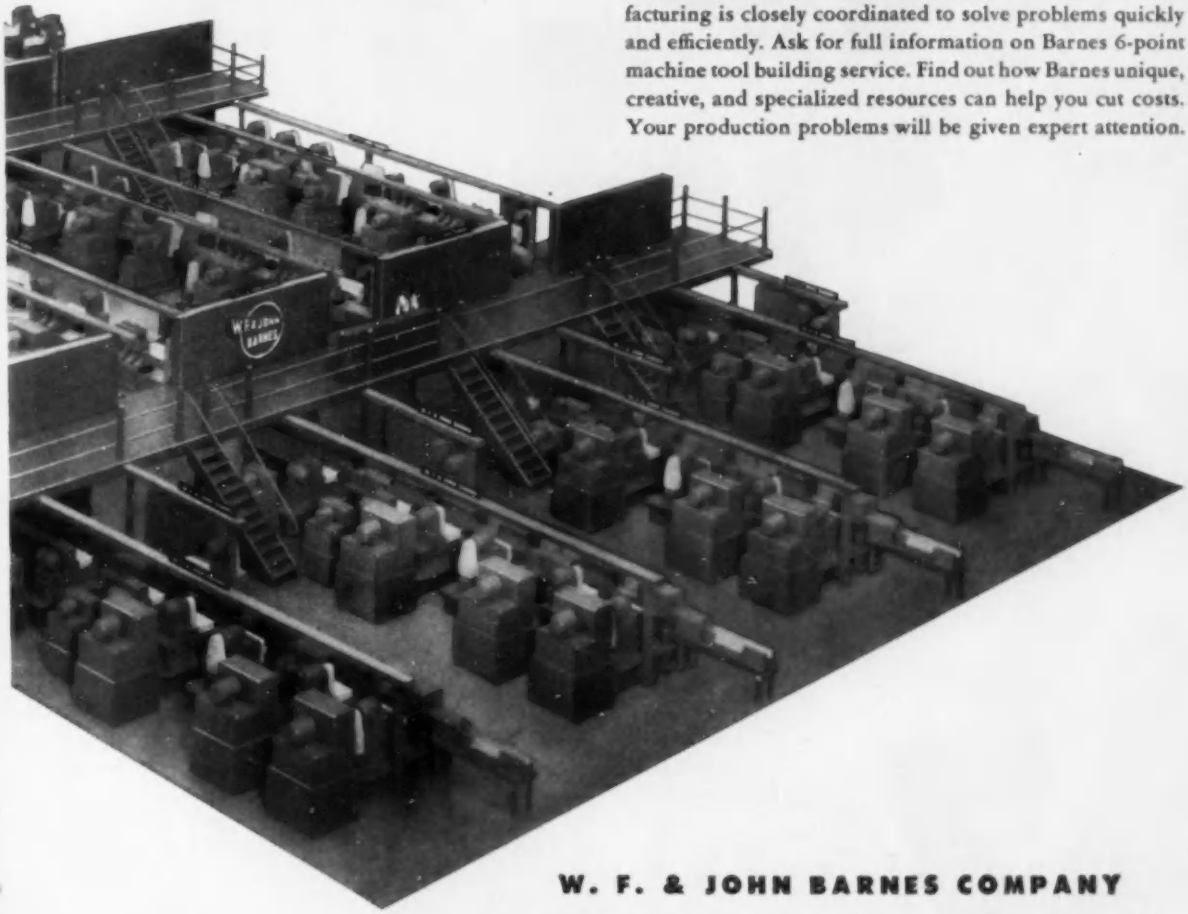
MULTIPLE SPINDLE DRILLING • BORING • TAPPING MACHINES

Mass Machining Methods

The latest developments in machine design applied to the complete machining of an automobile cylinder head will be exhibited by W. F. & John Barnes Company for the first time at the Machine Tool Show. You will see how skillful planning of plant layout may be combined with modern machining methods to effect substantial reductions in plant operating costs.

Get Full Information on Advantages of Barnes 6-Point Coordinated Machine Tool Building Service

This type of machine tool engineering and building service is available to you at Barnes. All engineering and manufacturing is closely coordinated to solve problems quickly and efficiently. Ask for full information on Barnes 6-point machine tool building service. Find out how Barnes unique, creative, and specialized resources can help you cut costs. Your production problems will be given expert attention.



W. F. & JOHN BARNES COMPANY

403 SOUTH WATER STREET, ROCKFORD, ILLINOIS

Special Electrical Controls

Food Machinery

AUTOMATIC PROGRESS-THRU AND TRANSFER TYPE MACHINES

a NEW automatic high-speed hobbing machine...

The Barber-Colman No. 3-6 Vertical Hobbing Machine is a single-purpose machine designed and built to meet the requirements of a specific job. The machine has standard basic elements, but the tooling, loading, gaging and handling are designed for maximum production of a specific part. Its high-speed operation makes it adaptable to all mass produced parts up to 3" diameter by 6" face width. Maximum pitch capacity is 10 DP. Hob speeds for carbide hobbing of non-ferrous and non-metallic blanks are available. Features which contribute to the high-speed operation of this machine include exceptionally large heat-treated and ground bed ways, short drives to the work and hob spindles, and a hardened and ground multiple-thread index worm.

In operation at the machine tool show . . . Booth No. 1322, Amphitheater

The No. 3-6 will be in production operation at our booth. Drop in and see it work. Get full information and literature there, with estimates for your jobs.

BUILDERS OF PRECISION GEAR

BARBER • COLMAN

No. 3-6

for high production gear cutting with automatic handling, loading and gaging

automatic loading	Blanks are automatically loaded from a vibratory hopper loading device. However, the type and variety of loading and handling devices with which this machine can be equipped are almost unlimited. Loading can be by magazine or conveyor when required.
automatic gaging	The gaging mechanism segregates gears of the correct size from those that are oversize or undersize. Size inspection is made by measuring over balls. If a pre-determined percentage of gears are out of tolerance, the machine can be made to stop automatically. The gaging unit can be furnished to inspect almost any elements of the gear.
automatic hob shifter	The automatic hob shifter can be set to shift a certain amount after each cycle, or it can be arranged to shift after a certain number of parts have been cut. Shifting increments can be changed easily by means of a graduated dial. The hob slide is clamped pneumatically.
centerdistance adjustment	The hob is set to the proper depth by means of a centerdistance adjusting mechanism, eliminating the usual time-consuming method of setting the hob to depth. The hob is placed in a fixture, and an indicator finger is set against the outside diameter. The indicator is calibrated to show the centerdistance between the work and the hob. This centerdistance setting is made by means of a graduated dial on the machine.

Some basic machine facts:

- Short, Compact Drives to Work and Hob Spindles
- Anti-Friction Work and Hob Spindle Bearings—Tapered Roller Type
- Pneumatic Work Clamping
- Self-Contained Lubrication and Coolant Supply
- Heat-Treated and Ground Bed V-Ways
- 2 HP, 1800 RPM Drive Motor
- Unitized Construction

HOBS • CUTTERS • REAMERS
HOBBING MACHINES
HOB SHARPENING MACHINES

BARBER COLMAN

Barber-Colman Company

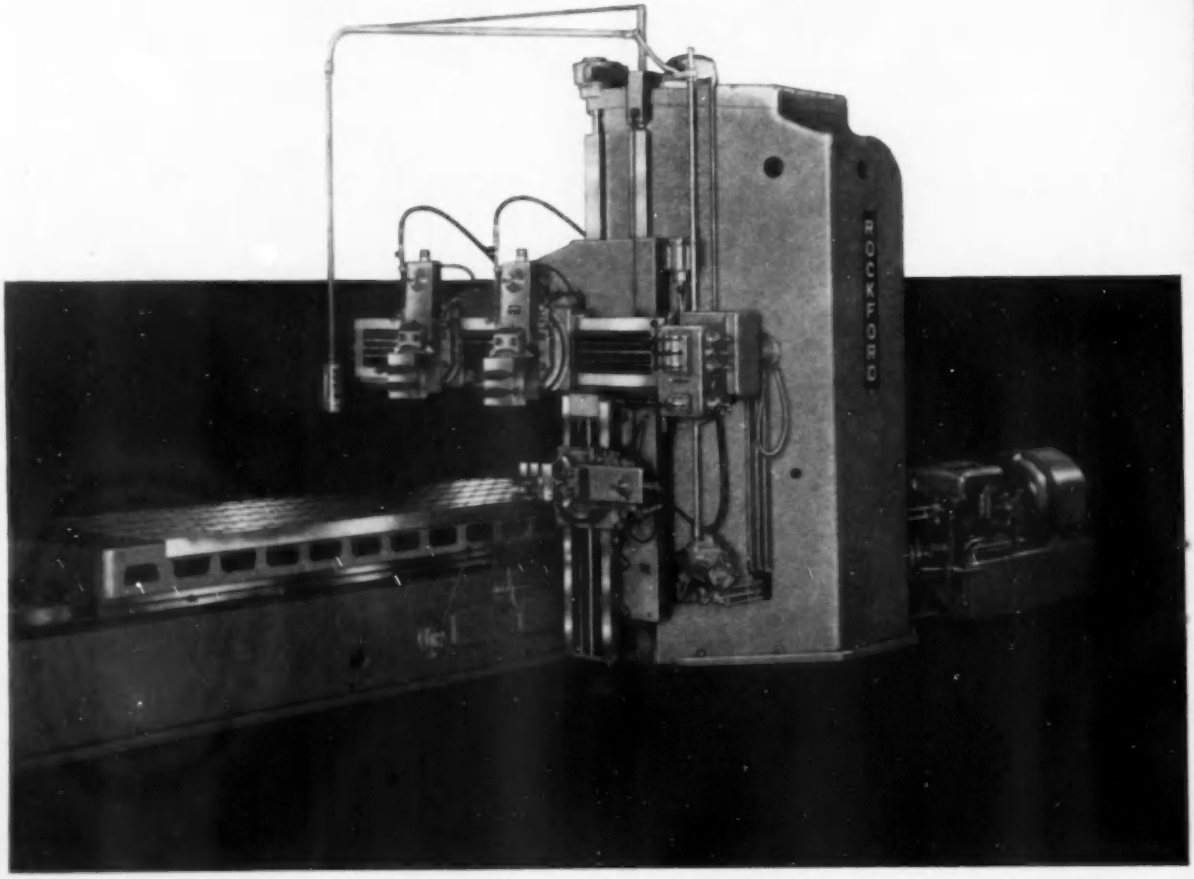
GENERAL OFFICES AND PLANT, 678 ROCK STREET, ROCKFORD, ILL.

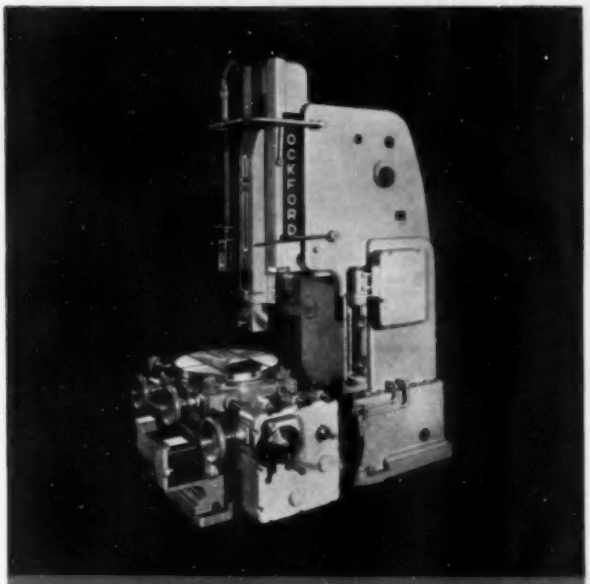
HOBS AND MACHINES SINCE 1911

hydraulic

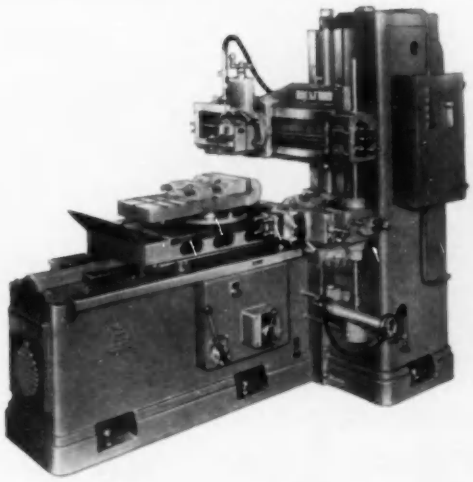
drive and feeds

Hydraulic Drive and Feeds
—as a basic feature of
modern machine tool design—
assures outstanding performance,
measured in terms of fine work quality,
high production
and low operating cost.





See the latest model "Hydraulic" Machines in action at Booth No. 1423. Ask any Rockford Machine Tool Co. representative for complete details on the greater profits that can be obtained with "Hydraulic" Shapers, Planers, Slotters, Shaper-Planers and Kopy-Kats.



Hy-Draulic

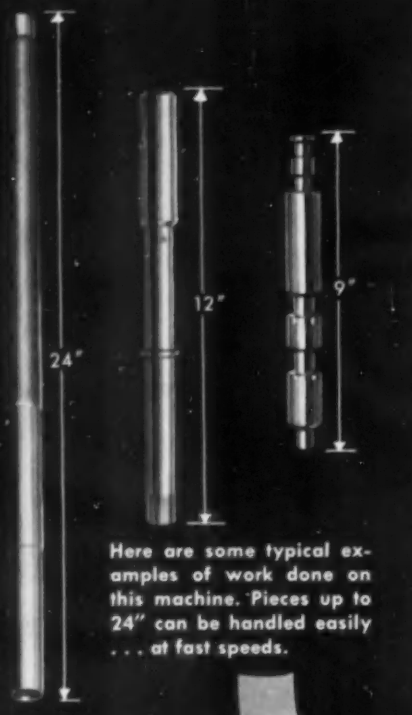
ROCKFORD MACHINE TOOL CO.

2500 KISHWAUKEE STREET • ROCKFORD, ILLINOIS

at the Machine Tool Show... Booth 1221

SEE THE GREENLEE SIX-SPINDLE BAR

AIR-FEED AUTOMATIC



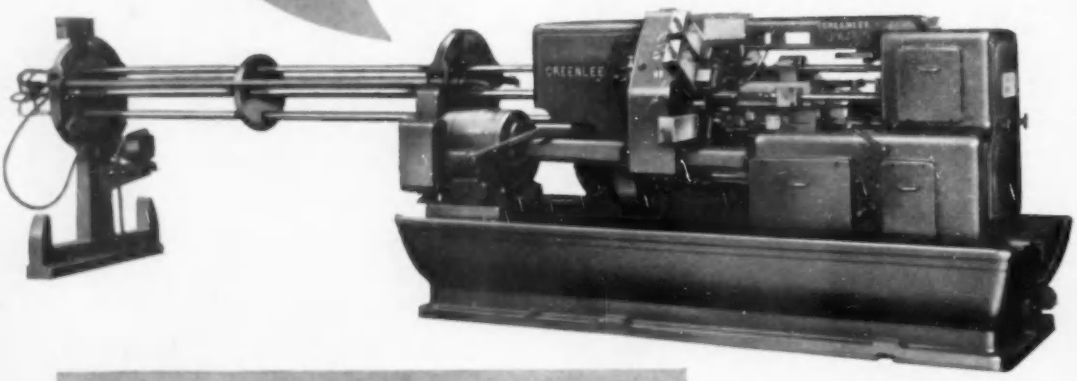
Here are some typical examples of work done on this machine. Pieces up to 24" can be handled easily . . . at fast speeds.

OPERATING WITH

Air-Feed Stock Reel . . .
Lead Screw Threading . . .
Thread Rolling . . .
and a complement of standard tooling attachments.

THE MACHINE TOOL SHOW
CHICAGO, ILL.
SEPT. 6-17, 1955
INTERNATIONAL AMPHITHEATRE

The air-feed machine can be modified to handle long parts as shown at left.

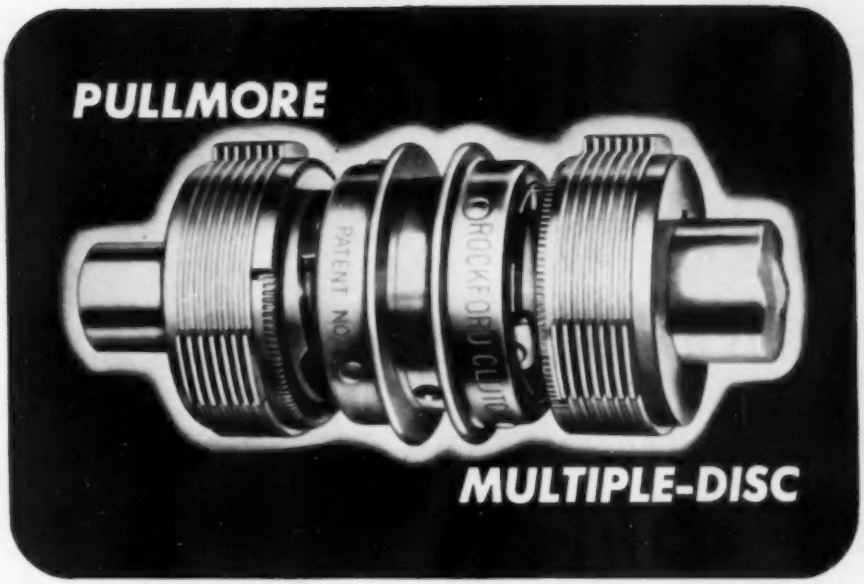


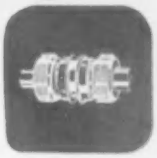
GREENLEE

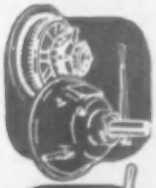
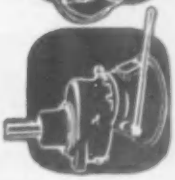
GREENLEE BROS. & CO.
1759 Mason Ave.
Rockford, Illinois

WRITE FOR COMPLETE INFORMATION

ROCKFORD





DOUBLE OR SINGLE TYPE APPLICATIONS

COMPACT DESIGN
HIGH TORQUE
HIGH-RATIO LEVERS
POSITIVE NEUTRAL
PRECISION BUILT
LONG WEAR LIFE
EASY ADJUSTMENT

* These compact, powerful, multiple-disc clutches are helping product engineers to reduce size and weight of the vital link between the driving and driven units of machine tools, lift trucks, overhead cranes and a wide variety of other production equipment. They readily fit into product designs, accommodating great torque capacity within small size. Precision grinding insures perfect fit on the clutch shaft. Symmetrical contours avoid drag that is caused by centrifugal force.

Send for This Handy Bulletin

Shows typical installations of ROCKFORD CLUTCHES and POWER TAKE-OFFS. Contains diagrams of unique applications. Furnishes capacity tables, dimensions and complete specifications.

ROCKFORD CLUTCH DIVISION BORG-WARNER
▲ 315 Catherine Street, Rockford, Illinois, U.S.A. ▲

CLUTCHES

See these new

SUNDSTRAND

Machines *in action* at the

Machine Tool Show

Sept. 6-17, 1955

International

Amphitheatre

Chicago, Illinois

BOOTH

1412

AUTOMATIC LATHES | SIMPLEX RIGIDMILS | DUPLEX RIGIDMILS

SUNDSTRAND

50 YEARS OF

"Engineered Production" Service"

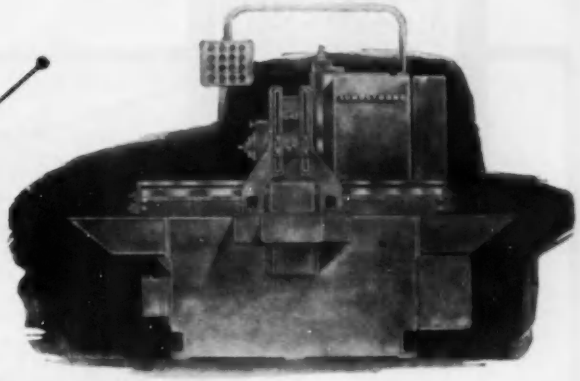
See In Action

1. The new line of Sundstrand Rigidmils
2. Punch card control of a multi-cycle lathe
3. Carbide milling of die blocks
4. Tracer turning with the new Sundstrand Automatic Multi-Cycle Tracer Control Unit
5. Low cost milling and centering of shafts

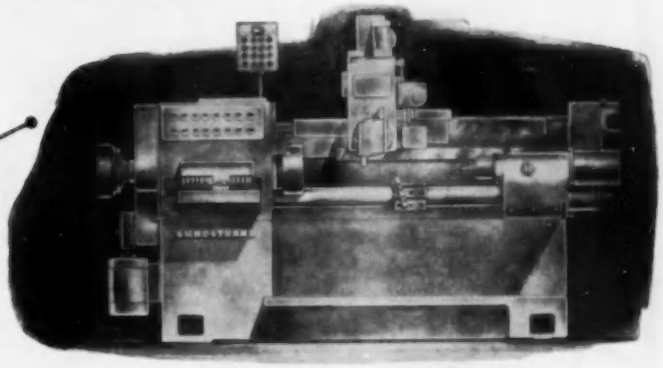
. . . Get an

"Engineered Production"

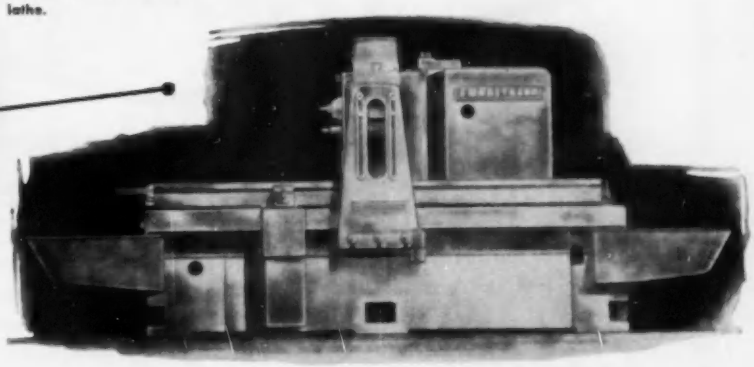
analysis of how these new machines can improve your production and lower costs.



New 5 H.P. Model C1 Hydraulic Feed RIGIDMIL

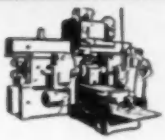


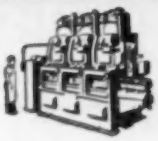
New 40 H.P. multi-cycle single point production lathe.



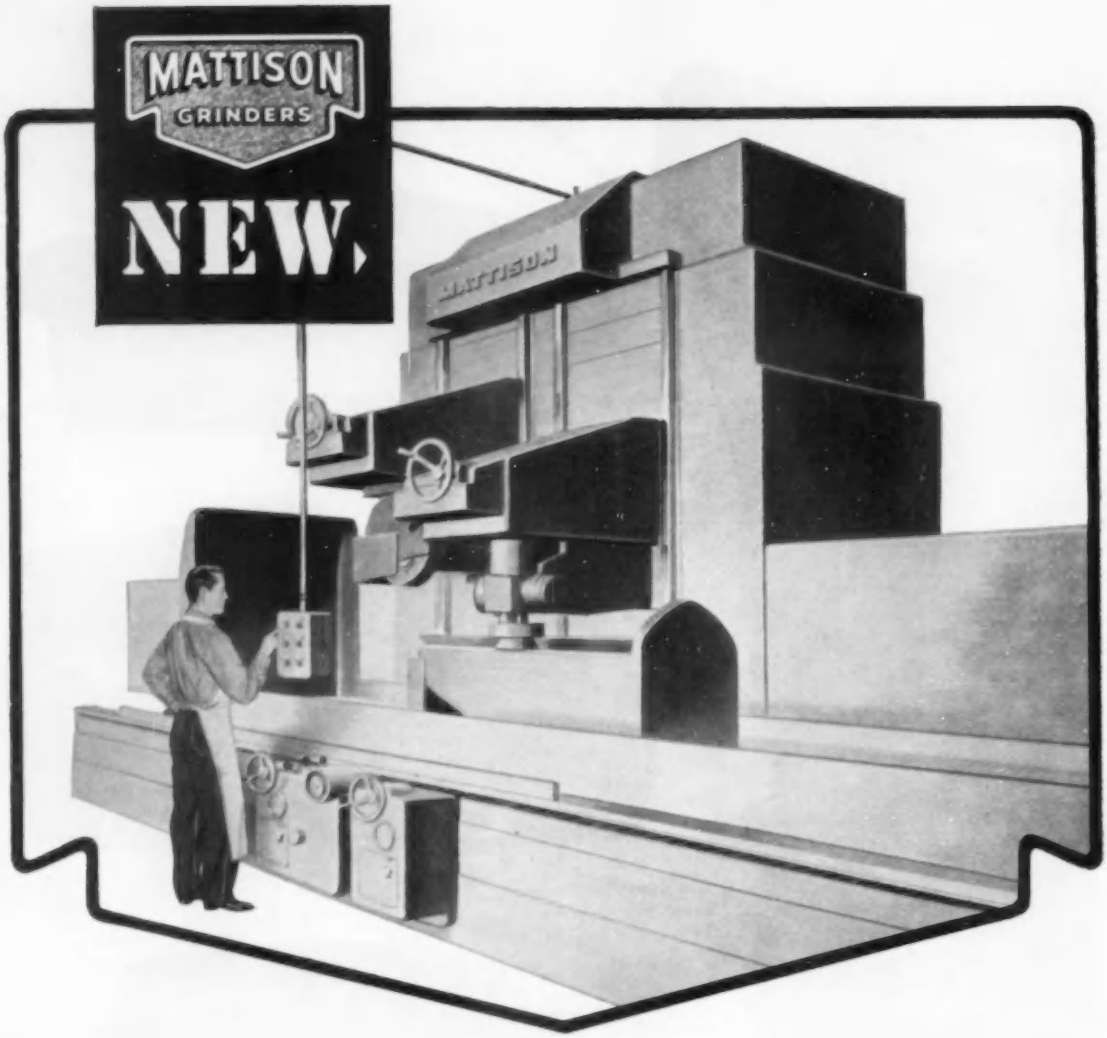
New Model C3 RIGIDMIL with mechanical feed.

TRIPLEX RIGIDMILS | SPECIAL MACHINES





SUNDSTRAND
Machine Tool Co.
2571 Eleventh St. • Rockford, Ill., U.S.A.



Mattison Combination Way and Surface Grinder

with independent vertical and horizontal spindles

It's a machine tool builder's machine, for grinding large bed castings, columns, tables, slides, saddles, and heads faster, to precision tolerances, without costly rehandling. You can grind "V" and flat ways, dovetails, shoulders, edges, radii, and contours . . . all in a *single setup*. Independent vertical and horizontal spindles permit you to hold two or more surfaces in exact relative alignment, grinding large machine parts faster and easier than ever before. Unique three-column, box-type construction assures maximum stock removal and fine finish. Entire machine is electrically controlled from the pendant. See new features demonstrated at the Show, Booth No. 1422.

SEE THEM AT THE SHOW—BOOTH NO. 1422

1) No. 24 Vertical Rotary Surface Grinder, with automatic cycling; 2) No. 400SS Vertical Spindle Reciprocating-Type Surface Grinder; 3) No. 72 Rotary Automatic High Production Surface Grinder, with four spindles; 4) Mattison High-Powered Precision Surface Grinder; 5) New Combination Way and Surface Grinder.

MATTISON
MACHINE WORKS
ROCKFORD ILL. U.S.A.

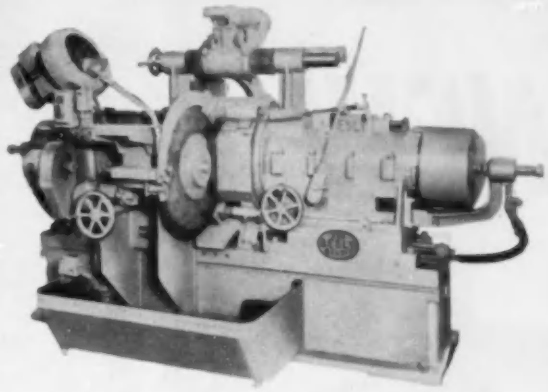
HIGH-POWERED PRECISION SURFACE GRINDERS

Get the Face Grinder that meets YOUR Needs!

For grinding equipment that assures lowest possible unit costs—with high output of ground pieces held to close tolerances for flatness, finish, parellelism and other essential qualities, look to Besly.

Besly Grinders are individually engineered to handle an endless variety of sizes, shapes and materials.

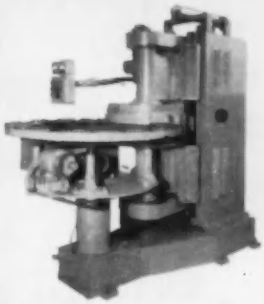
Ask us to analyze your grinding needs and make specific recommendations, or write for catalog No. G-54.



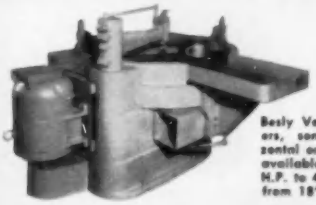
Besly double-horizontal spindle Disc Grinders available in five basic sizes with a wide range of feed arrangements for high production finishing of parallel surfaces.

BESLY-BOWEN #710-18" 30 HP Grinder. Equipped with two rotary work tables with special fixtures or magnetic chucks, automatic cycle control mechanism. Hydraulic and electrical equipment conforming to J.I.C. Standards. Four basic models available ranging from 5 to 100 H.P.

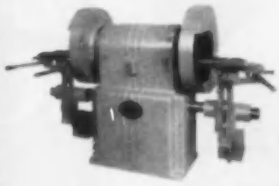
No. 953-36" Vertical Spindle Wet Grinder with push-button control of all operations. Continuously rotating feed wheel or fixture permits continuous production.



Besly No. 928-30/60 Double Vertical Spindle Dry Cell Spring Grinder equipped with a variable speed rotary unit and horizontal feed wheel.



Besly Vertical Spindle Grinders, sometimes called horizontal or "tub" grinders, are available in models from 5 H.P. to 40 H.P. to use wheels from 18" to 72" diameter.



BESLY #208-26" Horizontal Spindle Double Disc Dry Grinder. Arranged with geared lever feed tables and 15 HP motor.

BESLY-WELLES CORPORATION

Established as Charles H. Besly and Company in 1875
107 Dearborn Avenue, Beloit, Wisconsin

BESLY Taps, Drills, Tool Bits, Reamers and End Mills . . . High Speed Cutting Tools in a complete range of types and sizes.

Will Be Shown at Booth No. 911

NEW

See us at the
MACHINE TOOL SHOW
BOOTH 1218

No. 3-36 . . . 36" table travel . . . 84" x 16" table . . . full automatic hydraulic feed.

No. 3-36
HYDRAULIC MILLING MACHINE

Now—the family of Kent-Owens Milling Machines has expanded to give you the same unexcelled milling accuracy, speed and dependability for *larger size work!*

Proudly we present the No. 3-36 Hydraulic Milling Machine . . . the new "big brother" in the line of popular Kent-Owens Millers. Each Kent-Owens machine is ruggedly designed with advanced features throughout for greater dependability and accuracy to maintain tough production schedules. Write for bulletin 955 on wide range of hydraulic and hand-operated machines. Also, let Kent-Owens design and build your tooling and special machines.

Kent-Owens Machine Co., Toledo, O.

Simple . . . Rugged . . . Efficient

No. 2-20DS . . . Double Spindle for two milling operations . . . 20" table travel . . . 42" x 12" table. Hydraulic feed.

No. 1-14 . . . 14" table travel . . . 52" x 9" table . . . hydraulic table feed . . . full automatic cycle.

No. 2-20 . . . 20" table travel . . . 42" x 12" table . . . full automatic hydraulic feed.

No. 1-M . . . Hand feed to table and head . . . 25" x 9" table . . . 12" table travel . . . head counter-balance is adjustable.

Call on

KENT-OWENS
for MILLING MACHINES

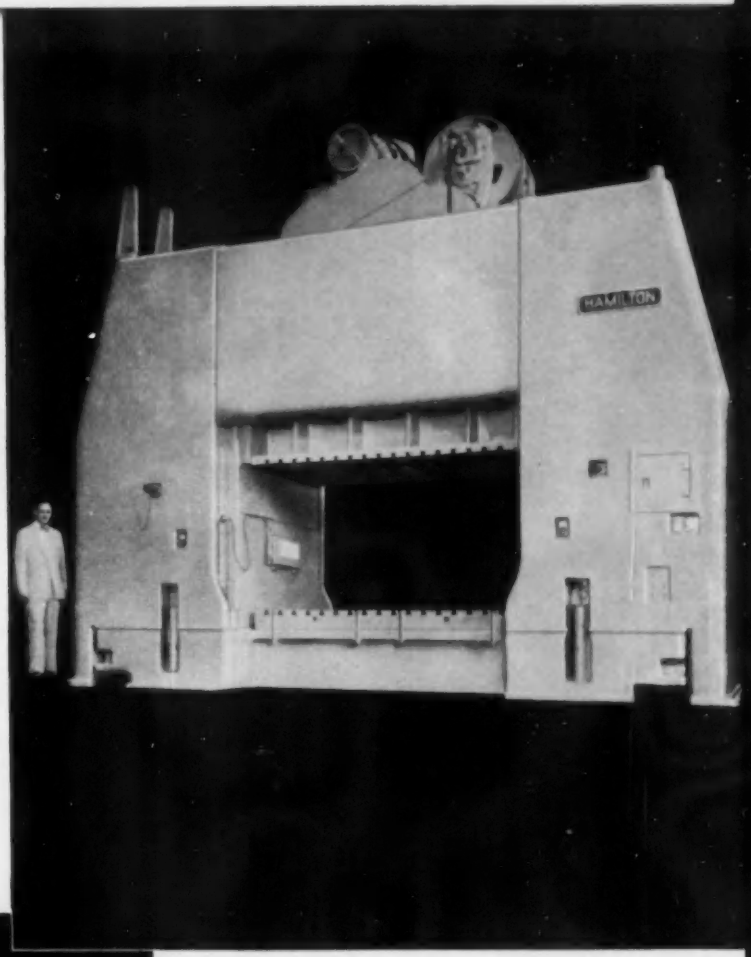
KENT-OWENS REPRESENTATIVES

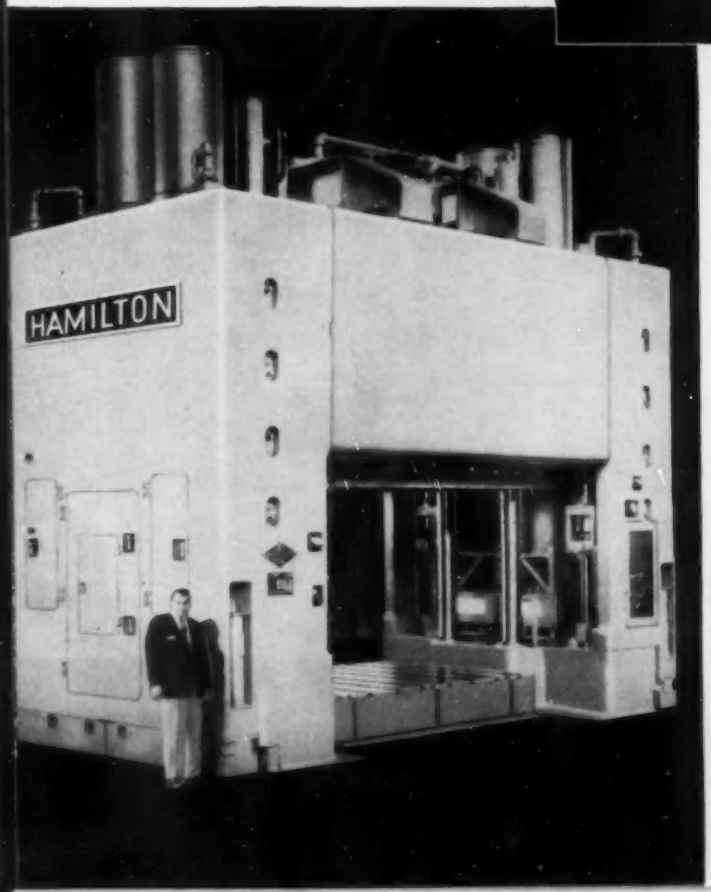
Ready for Delivery...

HAMILTON Presses

Now you can increase your productive capacity without delay. These Hamilton presses are in stock, as well as other single action, double action and triple action presses.

Hamilton's new unique policy of building these standard presses for stock means a sound investment for you. You'll profit by acting right away.





Like to get details on these available presses? Just pick up your phone and call Hamilton Division, Baldwin-Lima-Hamilton Corporation, Hamilton, Ohio.

BALDWIN BLH LIMA-HAMILTON

THE MACHINE TOOL SHOW

Visit Our Sales Booth No. 703

Hamilton Division

BALDWIN-LIMA-HAMILTON

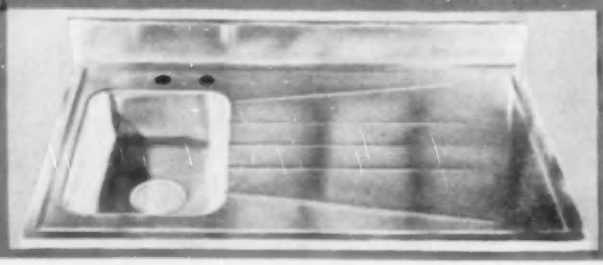
How a **CLEARING** Hydraulic Helped Elkay Reach a Big, New Market

For years the stainless steel sinks manufactured by Elkay Mfg. Co. in Cicero, Illinois had been considered a "class" item confined in consumer sales to the "carriage" trade. The sinks were made by laborious methods which required cutting corners of a flat sheet, bending the sides, and hand welding and polishing the corners smooth.

Elkay made a profitable decision when they purchased their first Clearing column type hydraulic press. They standardized on the sink bowl size so that sinks are now drawn quickly and economically in a single press operation. Elkay Lustertone stainless steel sinks are now within reach of the average homeowner. Elkay's confidence in Clearing equipment was demonstrated when they purchased their second column-type hydraulic.

Clearing presses make kitchen sinks, and practically everything else, quickly and economically. If you are planning conversion to more efficient production on a press, Clearing engineers are at your service.

Another popular Elkay item is this stainless steel unit, also manufactured economically with the help of a Clearing press.



FREE—New 40-page catalog on Clearing hydraulic presses. Write for it Now.

THE MACHINE TOOL SHOW

MT

CLEARING PRESSES

THE WAY TO EFFICIENT MASS PRODUCTION

CLEARING MACHINE CORPORATION DIVISION OF **U.S. INDUSTRIES, INC.**

6499 WEST 65TH STREET • CHICAGO 38, ILLINOIS • HAMILTON PLANT — HAMILTON, OHIO

CMC CLEARING

UI

The man who needs a new machine tool and doesn't buy it is paying for it anyway...

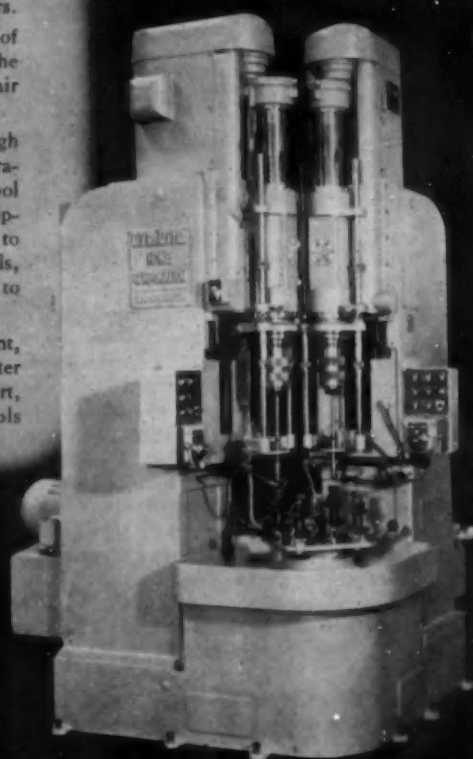
in high maintenance costs

LOOK beyond the age of your equipment when considering whether maintenance costs indicate your need for new machine tools. The design of equipment and the method of processing used are equally important factors.

For example, fast spindle speeds and the necessity of maintaining perfect alignment between spindle and the fixture or chuck, call for frequent adjustment, repair and replacement of parts.

You can greatly reduce such maintenance costs through the Microhoning* process—which employs comparatively slow spindle speeds and self-alignment of tool and workpiece. And the design of Microhoning equipment makes easily accessible all components likely to require servicing...follows industry-accepted standards, such as the J.I.C. electrical and hydraulic codes, to provide greater safety to both operator and machine.

In reviewing your processing methods and equipment, you may discover your maintenance costs are greater than the price of new Microhoning equipment. In short, you may be paying right now for new machine tools you don't have.



PART:

Cluster gear—bore must be straight and concentric with gear teeth.

PROBLEM:

Excessive maintenance costs on fixture driver and chucks.

SOLUTION:

MICROHONING—Simple stationary fixture—self-aligning tools—straight bore concentric with gear teeth—increased production.

*MICROHONING = STOCK REMOVAL + GEOMETRY + SIZE CONTROL + SURFACE FINISH

MICROMATIC HONE CORPORATION

8100 SCHOOLCRAFT AVE., DETROIT 38, MICHIGAN

MICROMATIC HONE CORP.
MICRO-MOLD MFG. DIV.
Boston Post Road
Guilford, Connecticut

MICROMATIC HONE CORP.
2205 Lee Street
Evanston, Illinois

MICROMATIC HONE CORP.
1535 Granda Vista Avenue
Los Angeles 23, California

MICROMATIC HONE LTD.
320 Grand River Avenue
Brantford, Ontario, Canada

MICROMATIC HONE CORP.
MICRO-MOLD MFG. DIV.
221 So. Pendleton Avenue
Pendleton, Indiana

MICROMATIC HONE CORP.
19115 Detroit Road
Cleveland 16, Ohio

REPRESENTATIVES: Allied Northwest Machine Tool Corp., 1222 S.E. 7th Ave., Portland 14, Oregon • Moran Machine Tool Company, 415 So. Second East, Salt Lake City, Utah • Porter McHenry & Supply Co., 1921 First Ave. South, Seattle 4, Washington

REPRESENTATIVES IN ALL PRINCIPAL COUNTRIES

MICRO-PRECISION DIVISION • 2205 Lee Street, Evanston, Illinois

Hydraulic Controls • Diesel fuel injection equipment

another

Outstanding Elmes Development

in Metalworking Press Design

the ELMES PIPELESS HYDRAULIC PRESS

THIS exclusive Elmes® Press design has put an end to high-pressure piping troubles. The main hydraulic circuit in these Elmes Presses *has no piping!* The advantages of this unique pipeless construction, proved by widespread use throughout industry over an extensive period, assure *a radical reduction in maintenance cost, with virtual elimination of downtime.*

In Elmes Pipeless Presses, all high-pressure hydraulic fluid is conducted through short, direct passages drilled in the structural parts. There are no high-pressure screwed joints to loosen, no oil dripping from loosened fittings, no breaking of welded joints. Press operation is smooth, quiet. Reversal of the ram is shockless. Vibration is greatly reduced. Turbulence and oil heating are minimized. Response to electrical controls is prompt and precise.

Any Elmes Metalworking Press, standard or special, can be equipped with pipeless construction—*and at no premium.* Find out now how your production will benefit from the matchless performance of Elmes Pipeless Hydraulic Presses. A proposal to suit your particular requirements, or further information, will be supplied on request. Contact your Elmes Distributor or write us direct.

HIGH-SPEED "PIPELESS" PRESS
with two reversible pumps

450-Ton Elmes Single-Action Metal Drawing & Forming Press, with many special features including the revolutionary Elmes Pipeless construction. This press employs two reversible pumps, providing the following operating speeds per minute: advance —550″, press—126″, return—550″.

BOOTH
No. 1121

Be sure to see the Elmes **PIPELESS** *Press in operation at the Show*

ELMES

AMERICAN STEEL FOUNDRIES • ELMES ENGINEERING DIVISION
1173 Tennessee Avenue...Cincinnati 29, Ohio

HYDRAULIC PRESSES & EQUIPMENT

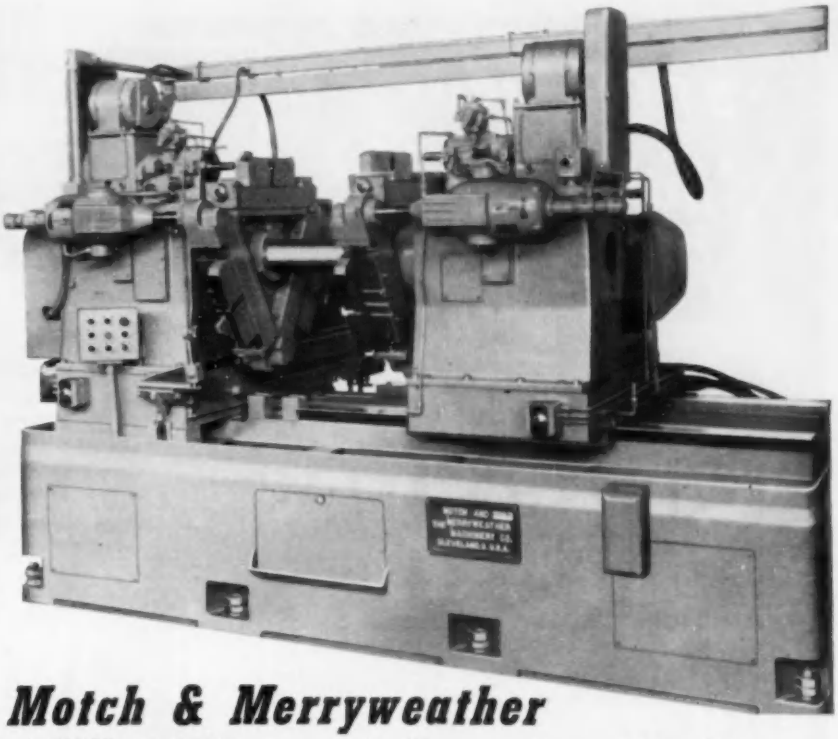
METAL-WORKING PRESSES • PLASTICS MOLDING PRESSES • PUMPS • ACCUMULATORS

Heavy Duty

Rigid

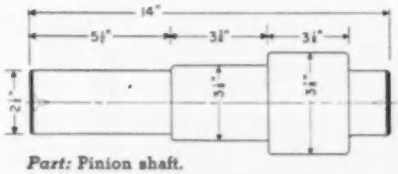
Accurate

Productive



The Motch & Merryweather
No. 3-MCT Milling and Centering Machine
FOR UNIVERSAL PRODUCTION

Adopt this Active Asset to Automation



Part: Pinion shaft.
Operation: Mill and center drill both ends.
Production: 220 pieces per hour.

Mass production, yet with extreme accuracy, — that is the central requirement for preparing parts which go to your automatic equipment. Begin automation *right* by preparing your parts *right* on the Motch & Merryweather 3-MCT Milling and Centering Machine. This universal heavy duty unit excels for high single-purpose production, while quick set-up makes short runs profitable. Automatic loading and unloading may be incorporated to handle extremely high production. The 3-MCT performs with a dispatch and precision hitherto unknown.

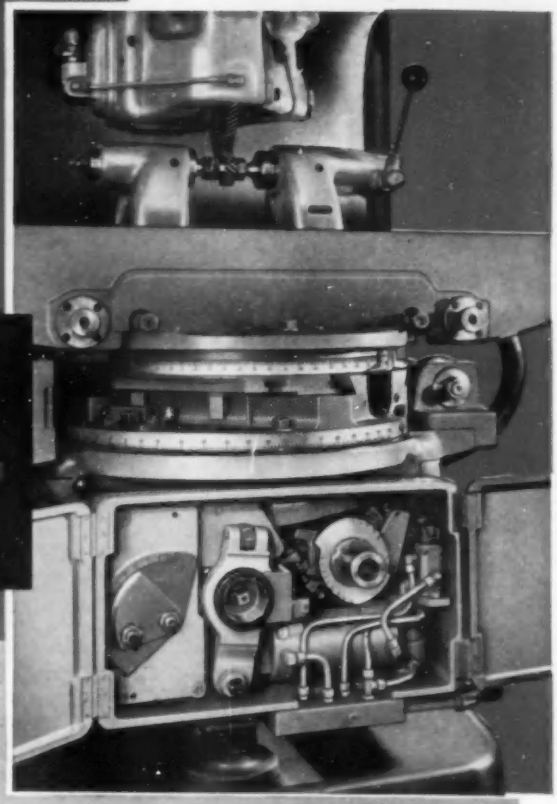
THE MOTCH & MERRYWEATHER MACHINERY CO.

MACHINERY MANUFACTURING DIVISION
CLEVELAND 13, OHIO

Builders also of Production Milling, Vertical Turning, Automatic and Special Machines

SPEED Gear Shaving and Reduce Costs with

AUTOMATIC DIFFERENTIAL UP-FEED



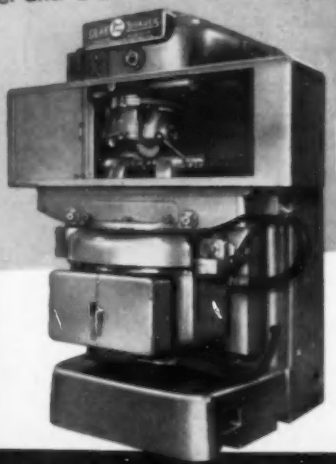
Red Ring Automatic Differential Up-Feed, one of the great developments in the mechanics of gear shaving, offers you such important advantages as:

- Automatic multi-stroke shaving cycle of selected increments of feed and dwell.
- Saves 5 to 10 seconds on each work unit.
- Prolongs cutter life up to 200%.
- Eliminates operator's errors and resultant cutter breakage.
- Minimizes operator fatigue.
- Greatly reduces loading and unloading time.
- Comes from backlash into feed for first cutting stroke about three times faster than that of any other device known.

See us at the Machine Tool Show, Booth 1215.

- Every element of the cycle is positive, precise and fast.

The Automatic Differential Up-Feed is available on Red Ring Shaving Machine Models GCI and GCU.



7250

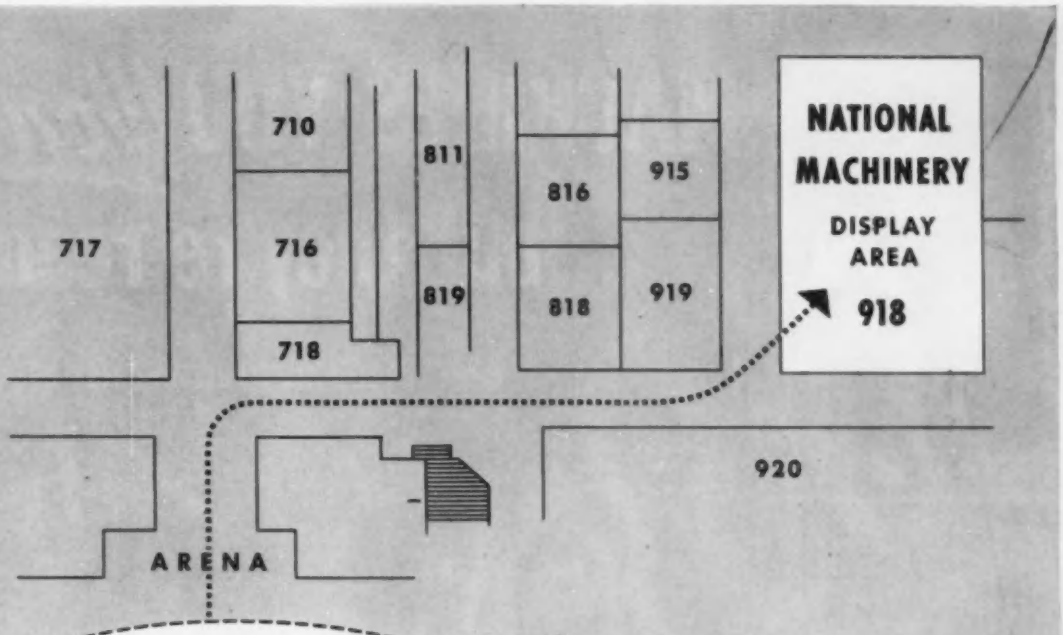
Write for Descriptive Data

SPUR AND HELICAL GEAR SPECIALISTS
ORIGINATORS OF ROTARY SHAVING AND ELLIPTOID TOOTH FORM

NATIONAL BROACH & MACHINE CO.

5600 ST. JEAN . . . . . DETROIT 13, MICHIGAN

WORLD'S LARGEST PRODUCER OF GEAR SHAVING EQUIPMENT



DISPLAY AREA 918 . . . PROGRESS IN FORGING

AT THE MACHINE TOOL SHOW,

CHICAGO, SEPTEMBER 6 TO 17!

We at National Machinery, WHQ*
for the development of advanced methods
and machinery for the forging industry,
for more economically producing
a wide variety of parts—
routine or unusual, ferrous or non-ferrous,
automatic or semi-automatic,
by cold forging or hot forging—
invite you to visit our working exhibit
at the coming machine tool show,
the first in seven years!

*WORLD HEADQUARTERS

NATIONAL
MACHINERY COMPANY
TIFFIN, OHIO—SINCE 1874

DESIGNERS AND BUILDERS OF MODERN FORGING MACHINES • MAXIPRESSES • REDUCEROLLS • COLD HEADERS • BOLTMAKERS • NUT FORMERS • TAPPERS • RAILMAKERS

Hartford Detroit Chicago

MACHINES YOU *Won't* ...but they're ready

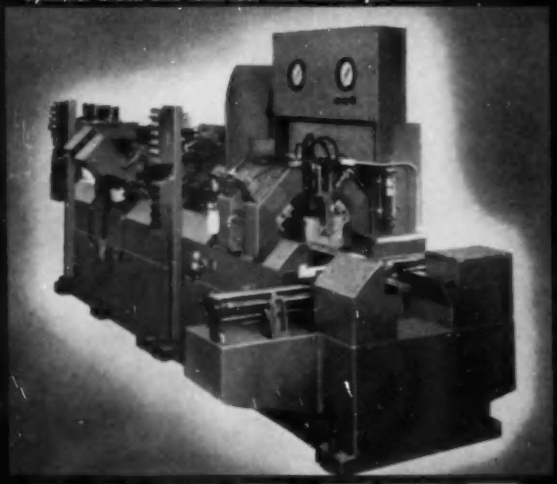
Leaks in defective cylinder blocks are precisely located by submersion under a pressure of 35 psi.

Transmission converter housings and end housings are tested in these two machines by putting air pressure into cavities, oil passages, etc.

PRODUCTION PRESSURE TEST

Completely automated leak locator handles 133 manifolds per hour, checks three separate passages.

Coupled units automatically insert four dowels per cylinder block and leak test 100 blocks per hour.



MODERN

See AT THE SHOW to go to work for you!

Burr-Master
GEAR DEBURRING AND CHAMFERING

Spur or helical gears and external spline from ⅝" to 9½" pitch diameter are accommodated by the eight single and two station models available. Complete chamfering and deburring job takes less than ⅓ second per tooth.

AUTOMATION AVAILABLE ON ALL MODELS IF DESIRED

Internal gears and splines from ⅝" to 3½" pitch diameter are deburred and chamfered on the smaller model with the larger machine handling those from 2" to 20" pitch diameter. Production rate: 5 teeth per second.

Single and multiple station hypoid pinion Burr-Masters handle more than 200 pinions per hour per station.

Industrial Engineering Co.

14230 BIRWOOD AVE., DETROIT 38, MICH.

AGAIN . . . LATHE LEADERSHIP FROM LODGE & SHIPLEY

15 | NEW

Powerturn LATHES

Exclusive new —

Computing HEAD

. . . fast, fool-proof indication of correct speed settings!

Centri-trol CONTROLS

. . . all controls conveniently grouped, distinctively shaped!

Turning problems into production is a built-in specialty of these New Lodge & Shipley POWERTURN Lathes. From headstock to tailstock ..... and down to the floor ..... POWERTURN Lathes are designed to facilitate turning to new, higher levels of profitable operation.

The many new features add importantly to Lodge & Shipley Lathe ability to produce more at lower cost.

New POWERTURN Lathes are produced in 13", 16", and 20" Standard Engine, Toolmaker, Gap, Manufacturing and COPYMATIC types.

Write for new literature on POWERTURN Lathes ..... newest and best from *The Lodge & Shipley Co., 3055 Colerain Ave., Cincinnati 25, Ohio.*

Features

- Positive brake
- Greater swing over cross slide
- Micrometer carriage dial
- New chip and coolant pan
- Redesigned feed levers
- Direct-reading cross and topslide dials
- Square base compound rest
- Built-in horsepower ammeter
- Front-mounted tailstock handwheel

THE MACHINE TOOL SHOW

See it NOW... See it at THE MACHINE TOOL SHOW!
September 6-17. Booth 502

At Booth 915 you will see Automatic Drilling and Tapping in "Operations Kingsbury"

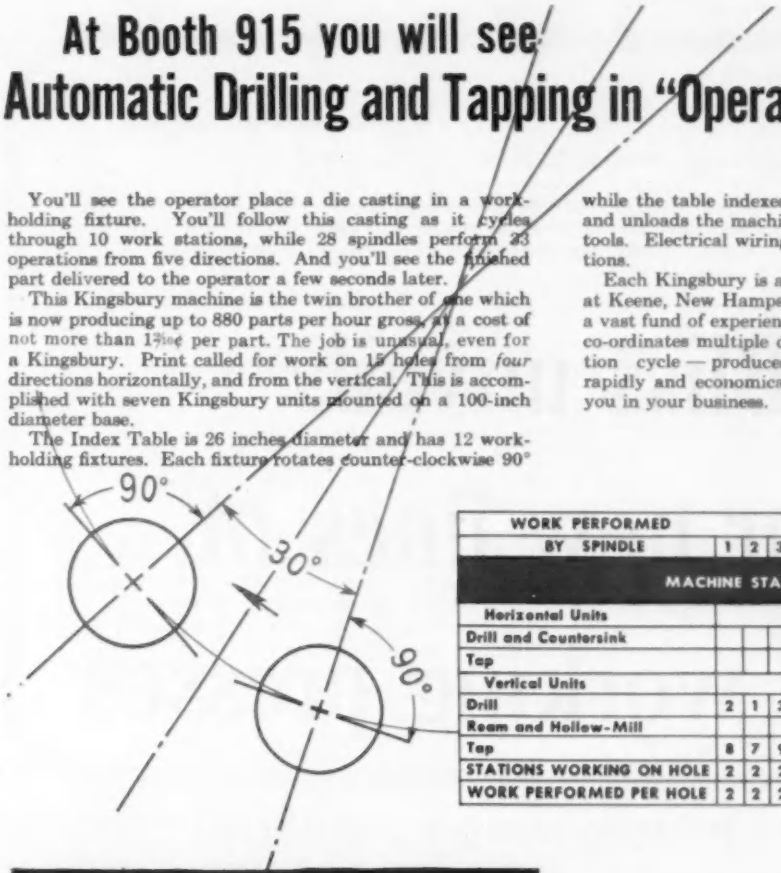
You'll see the operator place a die casting in a work-holding fixture. You'll follow this casting as it cycles through 10 work stations, while 28 spindles perform 33 operations from five directions. And you'll see the finished part delivered to the operator a few seconds later.

This Kingsbury machine is the twin brother of one which is now producing up to 880 parts per hour gross, at a cost of not more than 1½¢ per part. The job is unusual, even for a Kingsbury. Print called for work on 15 holes from *four* directions horizontally, and from the vertical. This is accomplished with seven Kingsbury units mounted on a 100-inch diameter base.

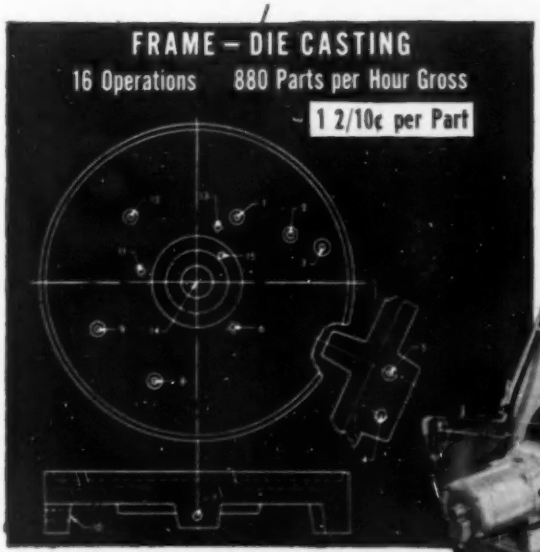
The Index Table is 26 inches diameter and has 12 work-holding fixtures. Each fixture rotates counter-clockwise 90° while the table indexes 30° clockwise. One operator loads and unloads the machine. Tool bushings guide the cutting tools. Electrical wiring and cabinet follow J.I.C. specifications.

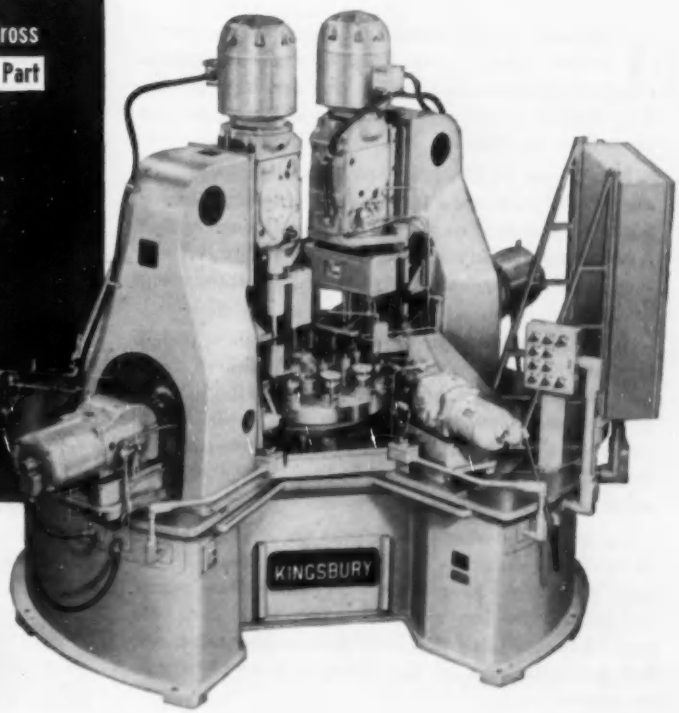
Each Kingsbury is a special machine, designed and built at Keene, New Hampshire, by men who have accumulated a vast fund of experience in this highly specialized work. It co-ordinates multiple operations into a continuous production cycle — produces accurate, interchangeable parts rapidly and economically. Perhaps a Kingsbury can help you in your business.

Kingsbury Machine Tool Corp.
113 Laurel Street, Keene, N. H.



WORK PERFORMED BY SPINDLE	HOLES NUMBERED														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
MACHINE STATION NUMBERS															
Horizontal Units															
Drill and Countersink				1	4		2			3					
Tap				7	10		8			9					
Vertical Units															
Drill	2	1	3			2		1	3		1	2	3		6
Ream and Hollow-Mill														5	
Tap	8	7	9			8		7	9		7	8	9		
STATIONS WORKING ON HOLE	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1
WORK PERFORMED PER HOLE	2	2	2	3	3	2	3	2	2	3	2	2	2	2	1





KINGSBURY
AUTOMATIC DRILLING AND TAPPING MACHINES
for Low-Cost High Production

Exhibit No. 1414

Bliss unveils four new lines of metal working presses

Many innovations in auxiliary equipment to be revealed for the first time

Visitors to the Machine Tool Show in Chicago will be able to witness operation of newly-designed inclinable, straightside, knuckle joint and high production presses – each representative of complete new press lines by Bliss.

In addition to the four new press lines, Bliss will also exhibit such important new developments in auxiliary equipment as its new Automation Control Switch, a new combination air friction clutch and brake, new feed mechanisms, and a host of other up-to-the-moment designs.

What promises to be an outstanding attraction of the Bliss exhibit, however, will be its premiere showing of four new color and sound movies on the subjects of press maintenance, automotive and appliance industry uses of Bliss-designed transfer feed presses, and on the Bliss-Crary Tonnage Limitor – a new and unusual "overload" device.

For those who intend to visit the Show, the contents of the Bliss exhibit are briefly described here with the hope that it will help them decide what they would particularly like to see, and thus help them make the most of their limited time. For those unable to attend, full particulars on all described here are available on request.

New line of enclosed inclinables with air friction clutches . . . A complete new line, ranging from 75 to 200 tons, will be represented at the Show by a 75-ton model. These are extra-heavy presses: frames are totally-enclosed and they have box-type crowns. All electrical, air and lubrication controls are housed within flush-fitted panels in the frame. Other features include: air friction clutches, motorized slide adjustments and inclining mechanisms, automatic return oil lubrication, bronze liners in the slide, heavy wrist-type connections, and extra-long gibbing. All die space dimensions and controls conform to JIC standards.

Streamlined, enclosed coining press has new wedge-type adjustment . . . Bliss' new line of coining presses will be represented at the Show by a 400-ton model which will be set up to strike souvenir Bliss medallions. Most outstanding feature of the press is its new motorized wedge-type adjustment which eliminates the need for a separate top lock device and compression springs. The new press is streamlined in appearance, and its controls are neatly housed in semi-flush panels. Two independent lubrication systems are now utilized in Bliss coining presses – one to circulate cascade type lubrication to the knuckles and the other for remainder of the press bearings.

new ideas highlighted in —

PREMIERE SHOWING OF FOUR MOVIES FOR PRESS USERS

These movies will be run in the Bliss exhibit on an around-the-clock basis. A movie "time-clock" will tell you when the one you want to see will begin. After the Show, all movies will be available upon request for showing to your own personnel.

Power Press Maintenance . . . The picture was developed for instruction of personnel responsible for the upkeep of presses. It shows correct procedures for set-up of new Bliss straightside and inclinable presses . . . describes proper lubrication, inspection and maintenance methods; tells how to check and adjust slide alignment, how to adjust ball joints . . . bearing clearances . . . clutches . . . and also describes free counsel available through Bliss' new Preventive Maintenance Program.

Bliss' 1000th transfer feed press . . . Viewers see how this 250-ton transfer feed press performs 11 separate operations on 5" steel blanks and produces finished auto starter brush end plates — all automatically. The dial feed, the dies required in each of the 11 stations, and the electrical interlocks that protect the press against misfeeds are all carefully explained.

Transfer feed presses in the appliance industry . . . Shows how a large appliance manufacturer uses a 700-ton Bliss transfer feed press to turn out refrigerator shelves and crisper pans from coil stock. Shows every step from the coil through the series of dies to the finished pans. The transfer feed mechanism alone makes it well worth the watching.

The Bliss-Crary tonnage Limitor . . . This movie explains a new device designed to protect presses from overloads at every point of the stroke. It reveals that, unlike earlier devices, the Limitor adjusts itself automatically to changing press capacity characteristics at different parts of the press cycle. How it's done is explained in the film in detail.

High production press has new feed, new lube system . . . A new Bliss 60-ton H-P press, capable of making more than 450 stampings per minute, represents the new line at the Show. The feeds have been redesigned and now incorporate a new rack and pinion feed drive, an anti-friction overunning feed clutch, and a newly-designed scrap shear. Another change has been in the press legs. In its left leg have been housed its air controls, and in the right is the "heart" of a completely new return oil lubrication system — a large oil reservoir, filters and pump. Controls have been removed from the press and mounted instead on a pedestal base.

"Packaged" straightside presses: controls, piping and wiring part of the package . . . The 250-ton straightside two-point press exhibited at the show, "baby" of the line, is typical of six new lines of "packaged" presses designed by E. W. Bliss Company to aid the stamping industry in its swing towards automated production. Presses in the line, two of which are "under-drives", embody JIC specifications; are shipped ready to be installed. About all that needs to be done is plug in air and electrical lines. Putting all pipes, wires and controls in uprights leaves clean, uncluttered exterior, and speeds maintenance. Other features include automatic recirculating oil systems, motorized plunger and blankholder adjustments, and high speed air or electric clutches—*and* Bliss' new Automation Control Switch for doper, kickers, lifters, Iron Hands and the like.

In addition . . . Bliss will take the wraps off its new Automation Switch, a new electro-mechanical nine-station rotary limit switch whose major advantage is the fact that despite its simplicity of adjustment and operation, it is accurate within less than *one degree*.

Also shown will be the details of Bliss' new crankshaft mounted combination air friction clutch and brake . . . new developments in die sets and die springs . . . new feeds and feed components . . . and a host of other developments, many of which may be of immediate and pressing interest to you. You're cordially invited to drop by the Bliss Exhibit, No. 1414, and see the latest developments in the pressed metal industry.

BLISS
SINCE 1857

is more than a name... it's a guarantee!

E. W. BLISS COMPANY, Canton, Ohio

PRESSES, ROLLING MILLS, SPECIAL MACHINERY

In Chicago...
you'll see for the first time

A NEW LINE OF GISHOLT MACHINES

identified by this medallion:

The new Gisholt MASTERLINE medallion identifies this new and improved series of machines—and re-emphasizes Gisholt achievements in building the master tools of industry since 1887.

Based upon nearly 70 years of specialized experience, the new Gisholt MASTERLINE machines are ready to give you production far in advance of their time.

Come in and inspect them at close range. Watch them operate. Learn what these new Gisholts can do to cut costs on your work.

Be sure to visit the Gisholt exhibit—Booth 1413, Exhibition Hall.

GISHOLT
MACHINE COMPANY

TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • SPECIAL MACHINES

EXPERIENCE

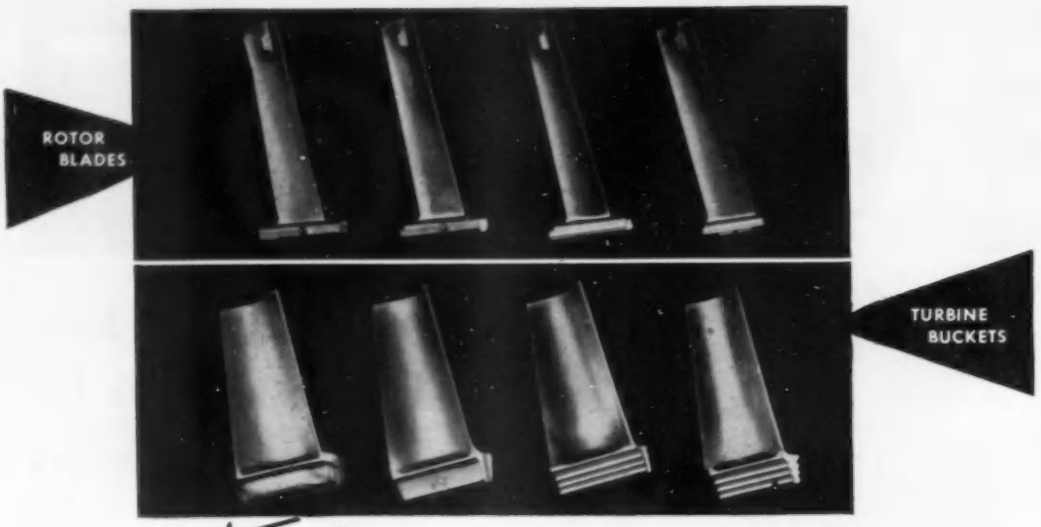
41 Years of Universal Joint Know-How Available for Automotive Design Engineers

Since 1914 MECHANICS engineers have contributed to universal joint progress (A) elimination of unnecessary attachments (B) elimination of unnecessary flanges — thus reducing weight (C) elimination of out-of-balance shapes (D) elimination of unsecure fastenings — thus increasing safety and life of operation (E) elimination of difficult assembly arrangement — thus speeding up assembly lines and decreasing down-time for servicing. Their help is available to automotive design engineers. So roll up your prints, dictate a note outlining your needs and send them to MECHANICS for universal joint design suggestions that will give your new models competitive advantages.

MECHANICS UNIVERSAL JOINT DIVISION
Borg-Warner • 2024 Harrison Ave., Rockford, Ill.

MECHANICS
Roller Bearing B/W
UNIVERSAL JOINTS

For Cars • Trucks • Tractors • Farm Implements • Road Machinery • Aircraft • Tanks • Busses and Industrial Equipment



A *Faster* MACHINING METHOD

for Turbine Buckets, Rotor and Stator Blades

Footburt Surface Broaching has provided the means of reducing costs on many parts that are difficult to machine in large quantities by other methods.

Each application is individually engineered with rapidly operated fixtures for easy loading and unloading and with Broaches designed to take full advantage of the capacity of the machine. Our many years experience in pioneering the art of Surface Broaching will assure the best solution to your machining problems. Send prints and hourly production requirements for recommendations on the application of Footburt Surface Broaching.

THE FOOTE-BURT COMPANY • Cleveland 8, Ohio

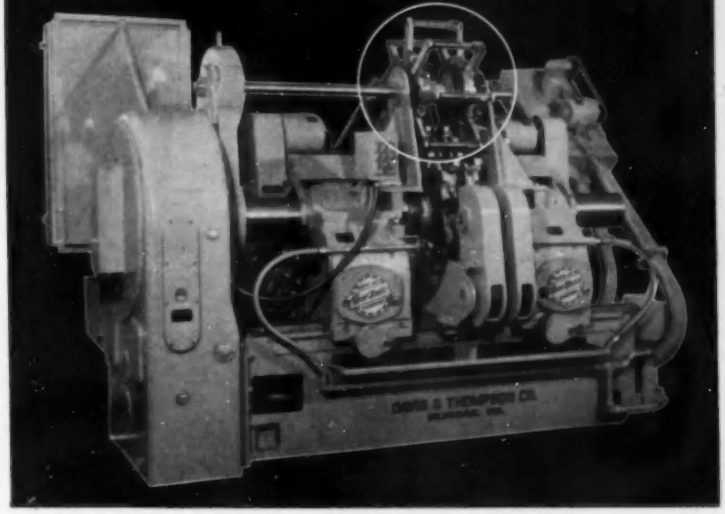
Detroit Office: General Motors Building

☆ *engineered for production*

FOOTBURT

PIONEERS IN SURFACE BROACHING

...Milling and Centering Steering Gear Shafts at the Rate of 360 Per Hour



This continuous type milling and centering machine has been furnished with an automatic unloader (indicated by circle) which transfers finished parts onto a conveyor or discharge chute. Milling and centering of both ends is done simultaneously and in continuous production.

Basically, this is a standard ROTO-MATIC machine tooled-up to handle special production requirements. Rough and finish milling and centering spindles in both heads have micrometer endwise adjustment. Heads are adjustable on the ways. With equalizing jaws in fixtures plus chain clamping, machine is fully automatic.

If you have work of this nature, consult D&T engineering for further details.

See our Exhibit at the National Machine Tool Builder's Show September 6-17 at the International Amphitheater, Chicago, Illinois.

BOOTH 602

Roto-Matic

Davis and Thompson Co.

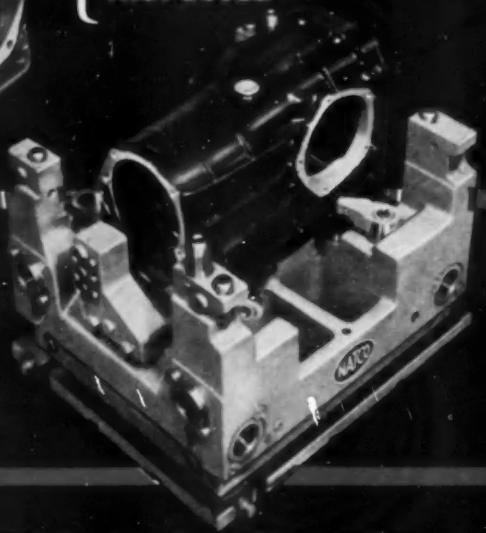
4660 N. 124th ST. MILWAUKEE 10, WISCONSIN

MORE TRANSMISSION CASES AT LESS COST.....

55 PARTS per HOUR

201 OPERATIONS ON EACH PART

DRILLED, BORED, REAMED, TAPPED, SPOTFACED, CROSS-FACED, MILLED, CHAMFERED and INSPECTED



Parts are loaded into individual holding units which are conveyed through the machine automatically. After machining is completed, chips are removed and the holding units pass through a washer and are returned to the first station.

for answers to your Drilling, Boring, Facing and Tapping problems

Call a Natco Field Engineer

CHICAGO, *Room 203, 6429 W. North Ave., Oak Park*
DETROIT, *10138 W. McNichols Rd.*
BUFFALO, *1807 Elmwood Ave.*
NEW YORK, *35 Beechwood Ave., Mount Vernon*

WITH A NEW NATCO HOLEWAY

BECOME OR REMAIN
COMPETITIVE THROUGH
MODERNIZATION

THE
MACHINE TOOL
SHOW
CHICAGO, ILL.
SEPT. 6-17, 1955
INTERNATIONAL AMPHITHEATRE

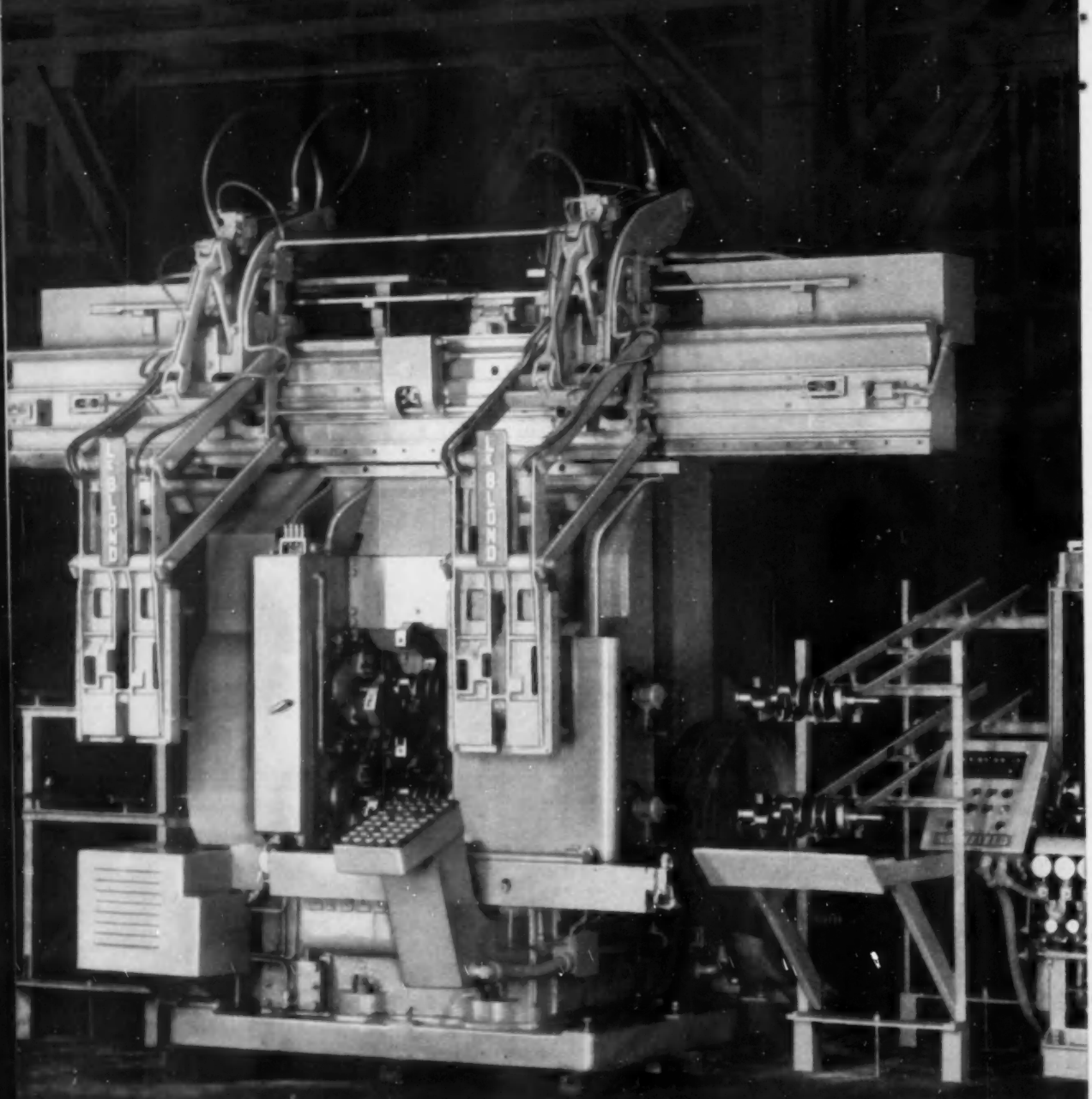
...Competitize with NATCO production!

NATIONAL AUTOMATIC TOOL COMPANY, INC.

RICHMOND, INDIANA

NATCO

FASTEST CRANKSHAFT LATHES



THE MACHINE TOOL SHOW

Crankshafts travel from right to left. The LeBlond LBA turns main bearings, flange and pilot, sprocket diameter and front end simultaneously. The automatic loader-unloader then delivers the crank to a gaging fixture where diameters of the No. 1, 3 and 5 main bearings are checked. The crankshaft is transferred to the LeBlond PBA where all the pin bearings of two cranks are turned at the same time. Note: Loading racks shown are temporary for runoff only.

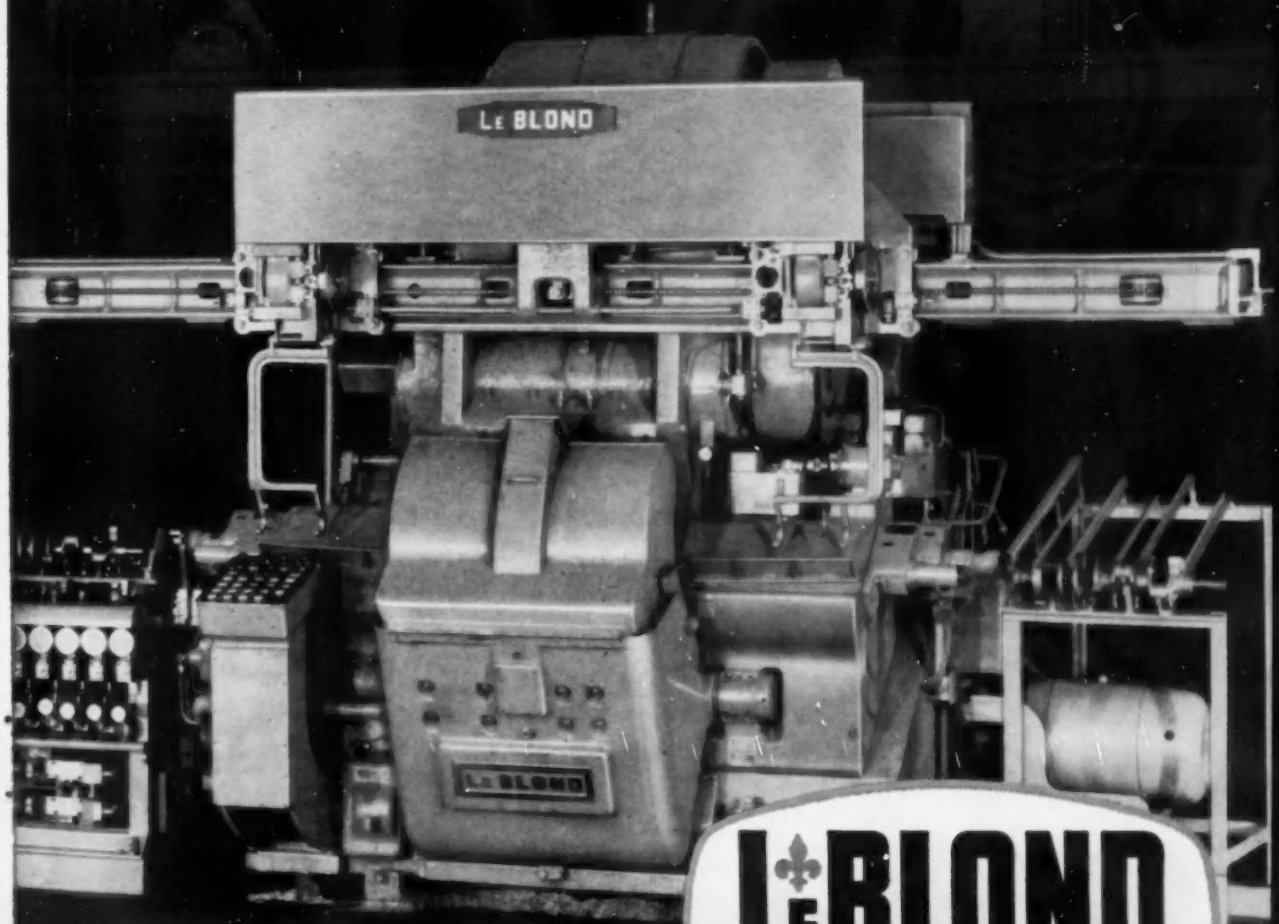
ANNOUNCED BY LeBLOND

Fifty-five precision-cast V-8 crankshafts per hour—highest production yet—are turned out by the latest LeBlond Automated Crank Turning Equipment.

The new unit consists of a LeBlond Automatic Line Bearing Center-Drive Lathe, a gaging fixture and a LeBlond Automatic Two-Spindle Pin Turning Machine. One operator can handle two such units. All turning and facing operations are completed on the crankshafts which have been prepared by spot milling and centering. Machine motions are sequenced electrically and hydraulically for continuous automatic operation.

You can benefit from LeBlond's experience as *the* pioneer of crankshaft-turning equipment over more than a half-century. Send us your crank-turning specifications for quotation.

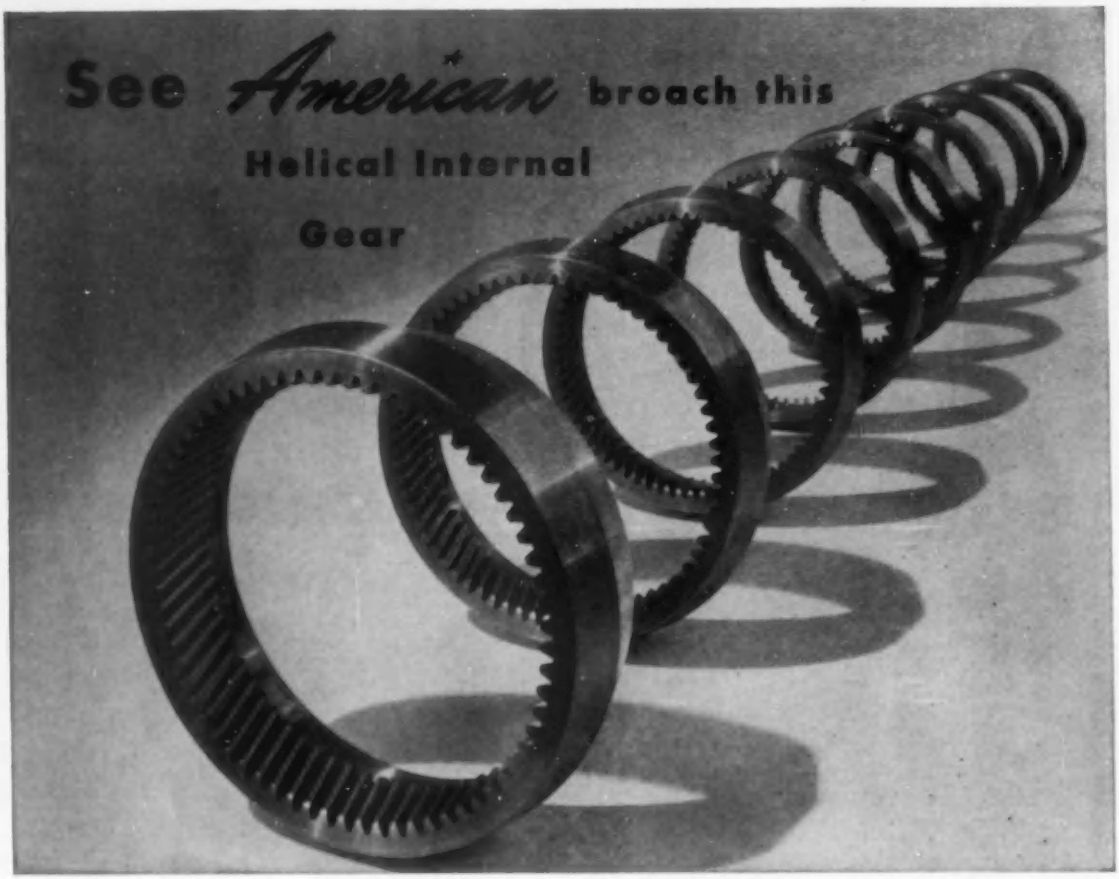
THE R. K. LEBLOND MACHINE TOOL COMPANY, CINCINNATI 8, OHIO



....cut with confidence

LeBLOND of Cincinnati

WORLD'S LARGEST BUILDER OF A COMPLETE LINE OF LATHES — FOR MORE THAN 67 YEARS.



AT BOOTH 1412 — MACHINE TOOL SHOW

American broaches the I.D. and 68 internal gear teeth in this 5½-inch diameter automotive transmission gear . . . does it fast and economically. You are cordially invited to see the machine and tooling in operation, as one of the many outstanding features of the Sundstrand and American Broach section at the show.

AMERICAN

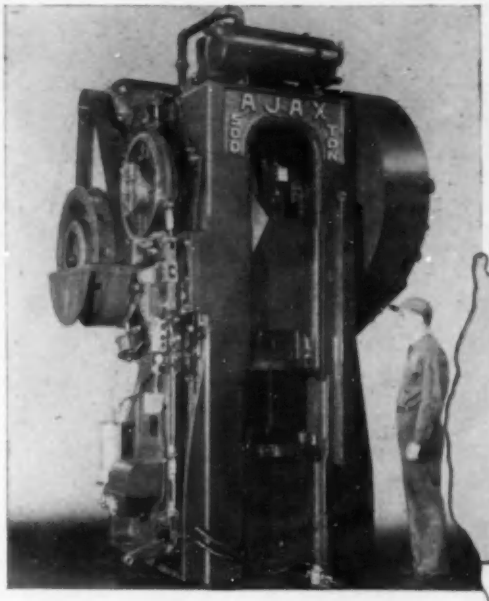
American BROACH & MACHINE CO.

A DIVISION OF SUNDSTRAND MACHINE TOOL CO.

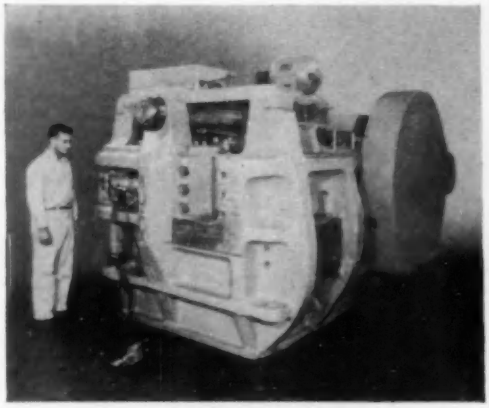
ANN ARBOR, MICHIGAN

SUNDSTRAND

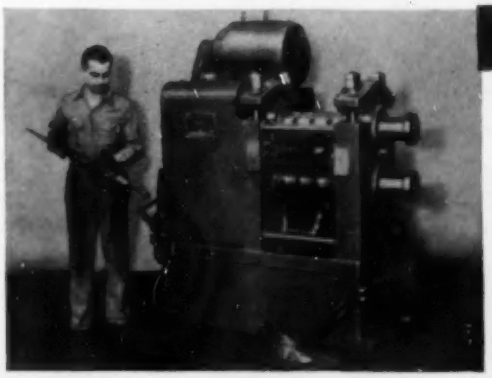
See American First — for the Best in Broaching Tools, Broaching Machines, Special Machinery



AJAX 500 TON FORGING PRESS



AJAX 3" FORGING MACHINE—
with automatic transfer mechanism



AJAX NO. O FORGING ROLL

see these

AJAX MACHINES

in operation at the

MACHINE TOOL SHOW

CHICAGO, ILL.
SEPT. 6-17, 1955
INTERNATIONAL AMPHITHEATRE

BOOTH NO. 1309

THE **Ajax** MANUFACTURING COMPANY
EUCLID BRANCH P. O.
CLEVELAND 17, OHIO

110 S. Dearborn St.
CHICAGO 3, ILL.

Dewart Building
NEW LONDON, CONN.

W. P. WOOLDRIDGE CO.
1209 Burlingame Ave.
BURLINGAME, CALIF.

6440 Fleet St.
LOS ANGELES 22, CALIF.

SNYDER SEGMENTED AUTOMATION in 91 station, 182 operation, in-line transfer machine features four segments which can operate independently or as a unit to assure continuous production of automotive automatic transmission cases at 100 cases an hour at 80% efficiency

BOOTH 1222

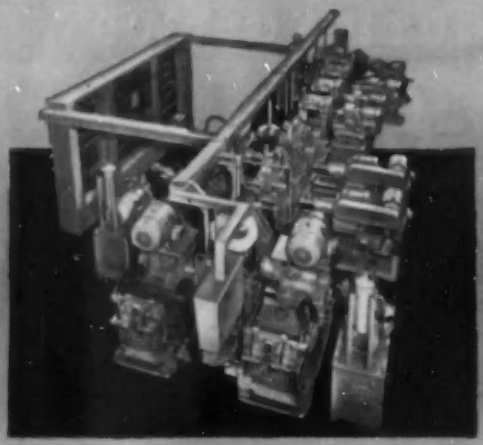
SNYDER

TOOL & ENGINEERING COMPANY

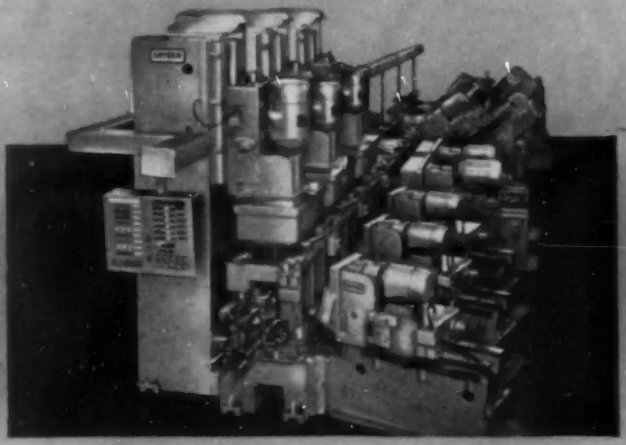
3400 E. LAFAYETTE, DETROIT 7, MICHIGAN

30 Years of Successful Cooperation with Leading American Industries

SEGMENT 1: 40 feet long, 19 stations, 10 spindles. Part manually loaded, both ends face milled, counterbored, three diameters rough and finish bored and faced, two pads side milled, pump pad face milled, clearance slot milled. Part tilted 90 degrees in processing.

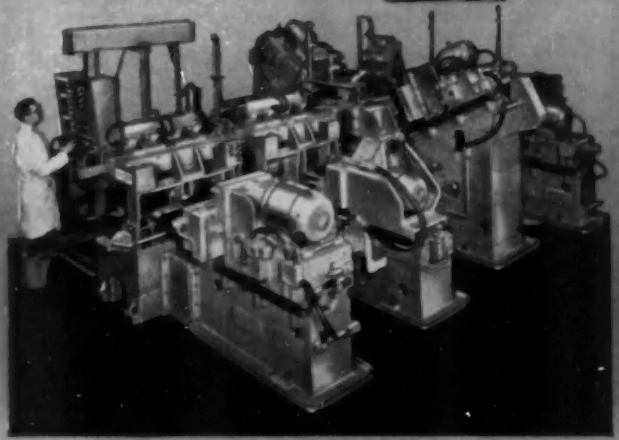


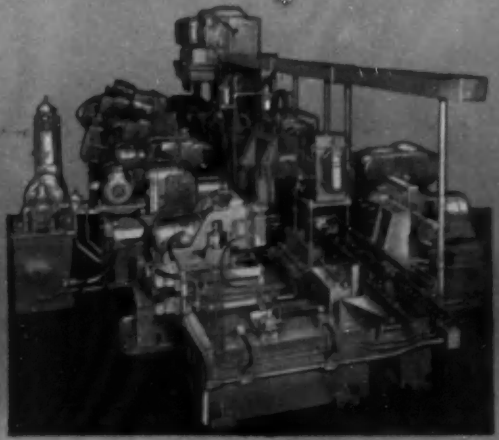
SEGMENT 2: 47 feet long, 31 stations, 91 spindles. In top face, end and at angular locations inside, 51 holes are drilled, countersunk, semi-finish and finish reamed, spotfaced, tapped. Part is tilted 90 degrees and rotated.



SEGMENT 3: 26 feet long, 17 stations, 21 spindles. Various drilling, chamfering, tapping, counterboring, reaming, spotfacing operations in both case sides. Part removed from transfer bar to special fixture and tipped 45 degrees to process angular inside hole, returned to transfer bar, turned 90 degrees, tilted 90 degrees to bring pump face up.

SEGMENT 4: 36 feet long, 24 stations, 60 spindles. Various drilling, chamfering, tapping, semi-finish boring and facing operations.





announcing ... *the* **NEW**

LELAND-GIFFORD

HOLE LOCATOR

DRILLING MACHINE

Here is the first really new development in drilling machines since Leland-Gifford introduced the motor spindle drill.

An entirely new system for locating and drilling holes, the HOLE LOCATOR eliminates costly fixtures . . . even the need for laying out individual work pieces. It will handle many jobs now assigned to jig borers for lack of a quick, simplified, less expensive method. It gives you an invaluable means of producing experimental parts, replacement pieces, short runs and even production work at new low cost.

Available in the capacities of standard Leland-Gifford No. 2 and No. 3 Drilling Machines, it offers all the well known L-G features for quick tool and speed changes to handle drilling, reaming, spot facing, counterboring and similar operations.

SEE IT IN ACTION AT THE MACHINE TOOL SHOW

BOOTH 321 (Upper North Hall)

Make your first stop the Leland-Gifford Booth. See the new HOLE LOCATOR as well as the latest in sensitive and high speed drilling machines.

HOW IT WORKS

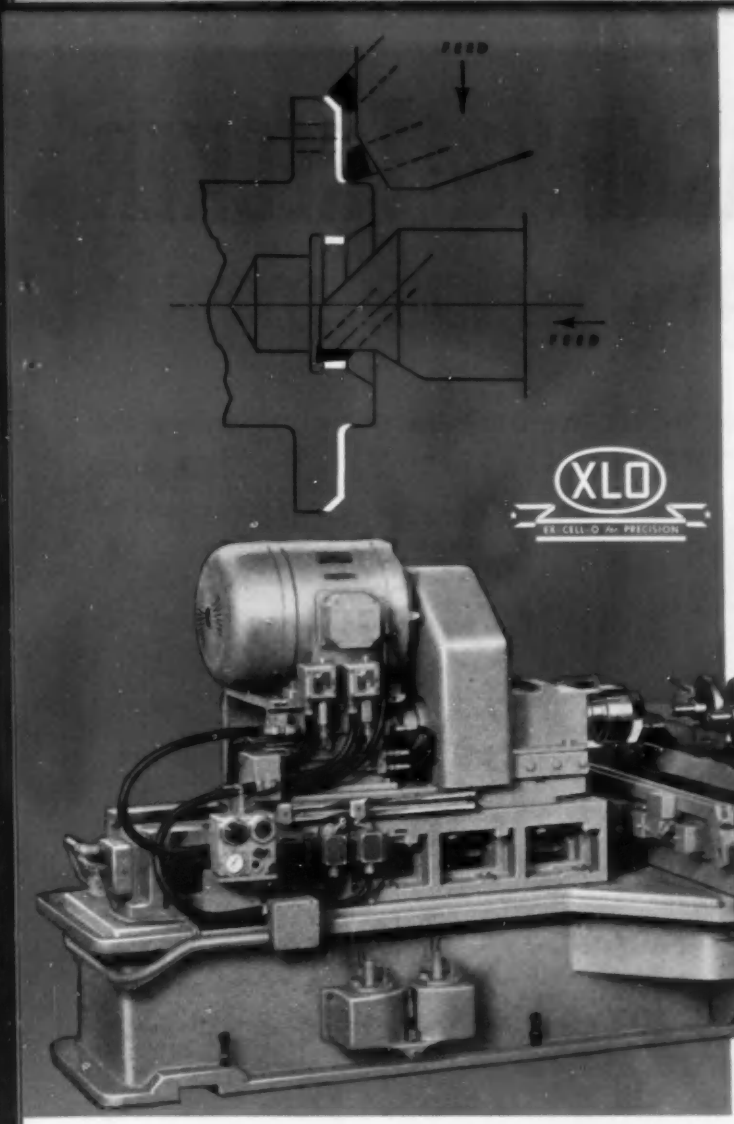
The work table is equipped with quick-acting hold-down clamps. Releasing dual locks permits lateral, forward and back or compound table motion. An optical viewer with double cross hairs and 20:1 magnification aligns the table with a layout chart which is registered in relation to the machine spindle. Hole locations are precisely established from intersecting lines scribed on the chart from blueprint dimensions. Duplicate parts can be produced from the same layout or the chart can be filed for future use.

LELAND-GIFFORD

Drilling Machines

WORCESTER 1, MASSACHUSETTS, U.S.A.

- **CHICAGO 45**
  2515 West Peterson Ave.
- **DETROIT**
  10429 West McNichols Rd.
- **CLEVELAND 22**
  P.O. Box 853
- **NEW YORK OFFICE**
  75 South Orange Ave.
  South Orange, N. J.
- **LOS ANGELES OFFICE**
  2620 Leonis Blvd., Vernon 58, Cal.
- **INDIANAPOLIS 6**
  P. O. Box 1051
- **ROCHESTER 12**
  P. O. Box 24, Charlotte Station



On this Ex-Cell-O special Machine two standard, hydraulically operated slides are mounted on a base with a transfer type fixture between them. The left slide, which supports the spindles, advances, and hydraulically operated chucks grip and rotate the parts. Then the right slide carrying the tools advances. Crankshaft operations include precision boring a diameter within limits of ±.0005", holding the bore concentric with main bearings, facing a surface square with main bearings, and chamfering an edge. Surface cuts are indicated in white in diagram at left.

SEE EX-CELL-O AT THE MACHINE TOOL SHOW CHICAGO SEPT. 6-17 BOOTH 3519

EX-CELL-O Special Machine Bores, Faces 2 Crankshafts SIMULTANEOUSLY

What an improvement!

Automation equipment picks up *two* automotive crankshafts, places them in machining position, bores, faces and chamfers the flange ends simultaneously, and transfers them to the unloading position *all in one automatic cycle.*

Building special purpose machines is an Ex-Cell-O forte. Manufacturers with problems in accuracy, production, and in combining numerous operations, look to Ex-Cell-O.

In return for this confidence Ex-Cell-O builds them special machines which quickly pay for themselves through substantial production increases, improved quality, and reduced unit costs.

Whatever your plans for greater, more economical production, they can be materialized at Ex-Cell-O. Your Ex-Cell-O representative will be happy to discuss them with you.

EX-CELL-O CORPORATION

DETROIT 32, MICHIGAN

MANUFACTURERS OF PRECISION MACHINE TOOLS • GRINDING SPINDLES
CUTTING TOOLS • RAILROAD PINS AND BUSHINGS • DRILL JIG BUSHINGS
AIRCRAFT AND MISCELLANEOUS PRODUCTION PARTS • DAIRY EQUIPMENT

55-38

KEARNEY & TRECKER
expansion and new

See these outstanding machines in Booth 508

★ **New TK Series Milling Machines** — incomparably modern titans of general purpose production!

★ **New TF Series Milling Machine** — strikingly new models featuring remarkable twin-screw knee support.

★ **New Model CE Milling Machines** — the simplified, precision-built, economy producer for schools, maintenance and small tool work.

★ **New Ram Head Milling Machines** — versatile performers featuring combination arrangements of horizontal, vertical and universal spindles.

★ **New Mil-waukee-Mil Series Milling Machines** — flexible, power laden, broad capacity, bed-type production tools.

★ **New Automatric Precision Boring Machines** — superb vertical models introducing a non-wearing twin-screw measuring system.

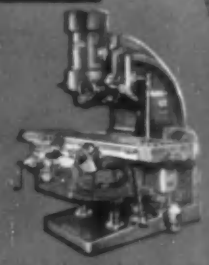
★ **New Automatic Transfer Machines** — Quill Feed unit, Way-Type Drilling unit, Lead Screw Tapping unit, Rotary Index Table, Feed Slide.

★ **New Compudex** — the precision indexing computer for rotary tables and dividing heads.

★ **New Tri-D Rotary Milling Head** — the amazing attachment which will produce almost any geometric shape in metal.

This scale model of Kearney & Trecker Machine Tool Show Exhibit represents 6500 sq. ft. of modern machine tools in action.

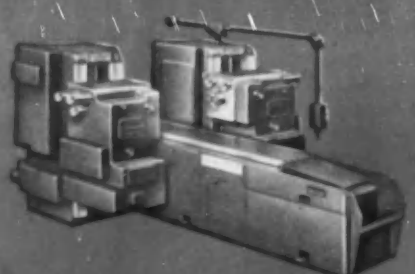
NEW TK SERIES Milling Machines — Available in four sizes Plain and Vertical styles . . . power from 20 hp to 50 hp.



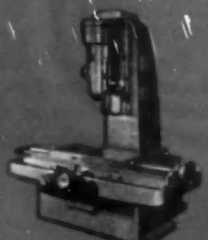
NEW TF SERIES Milling Machines —Available in five sizes Plain, Universal and Vertical styles from 10 hp to 50 hp.

NEW MODEL CE Milling Machines — Available in either 3 hp No. 2 or 7½ hp No. 3 size, both in Plain and Universal styles.

NEW RAM HEAD Milling Machines — Built in 21 different machine sizes and styles from No. 2 to No. 4, Plain and Universal.



NEW MIL-WAUKEE-MIL Production Milling Machines — over 300 combinations available in Simplex and Duplex styles.



NEW MODEL C AUTOMETRIC Vertical Precision Boring Machines — Two sizes, No. 3 and No. 4. Also available in horizontal style, No. 2.

NEW TRI-D MILLING HEAD — Plain, rotary and angular milling made easy. Adaptable to almost any make of Horizontal and some Vertical milling machines.

unfolds results of $18,700,000 product development program

An extraordinary investment to bring you MORE PRODUCTIVITY and QUALITY . . . GREATER ECONOMY and PERFORMANCE in the new machine tools you buy from KEARNEY & TRECKER

Yes, the 1955 Kearney & Trecker Machine Tool Show story reflects a tremendous investment any way you look at it—$3,500,000 in new buildings and facilities; $8,900,000 in new tools and equipment; $6,300,000 in research and new product development.

And at the Show you'll see the positive results of this unprecedented eight-year growth and development program. You'll see 31 unusual exhibits featuring among them not one, but four new lines of knee-type milling machines comprising 81 different models, styles and sizes; an entirely new line of medium size bed-type production milling machines with electro-hydraulic pendant control; a new group of vertical precision boring machines; new attachments for rotary milling and precision index computing; automatic transfer type equipment — all of this and more to be seen and demonstrated in Booth 508.

Today, Kearney & Trecker offers you standard and special production machines that can meet any of your needs — with more productivity and quality, with greater economy and performance than ever before. What's more, you can obtain new machines either by outright purchase, conditional sales agreement or any of three Kearney & Trecker Tool-Lease plans.

See or write your nearest Kearney & Trecker representative. He'll be glad to discuss your production requirements and what these new Kearney & Trecker machines can do to meet them.

NEW 13-STATION AUTOMATIC TRANSFER MACHINE — It mills, drills, reams, taps, spotfaces and cores upper integrally-cast bearing cap blocks at production rate of 72 sets per hour.

NEW GANTRY-TYPE WING SKIN TRACER-CONTROLLED MILLING MACHINE — A 125-ton, 360° and rise and fall functioning giant of production, which is typical of recent Kearney & Trecker developments for the aircraft industry. Similar machines can be seen in operation at Kearney & Trecker's new Special Machinery Division plant in Milwaukee during the Show.

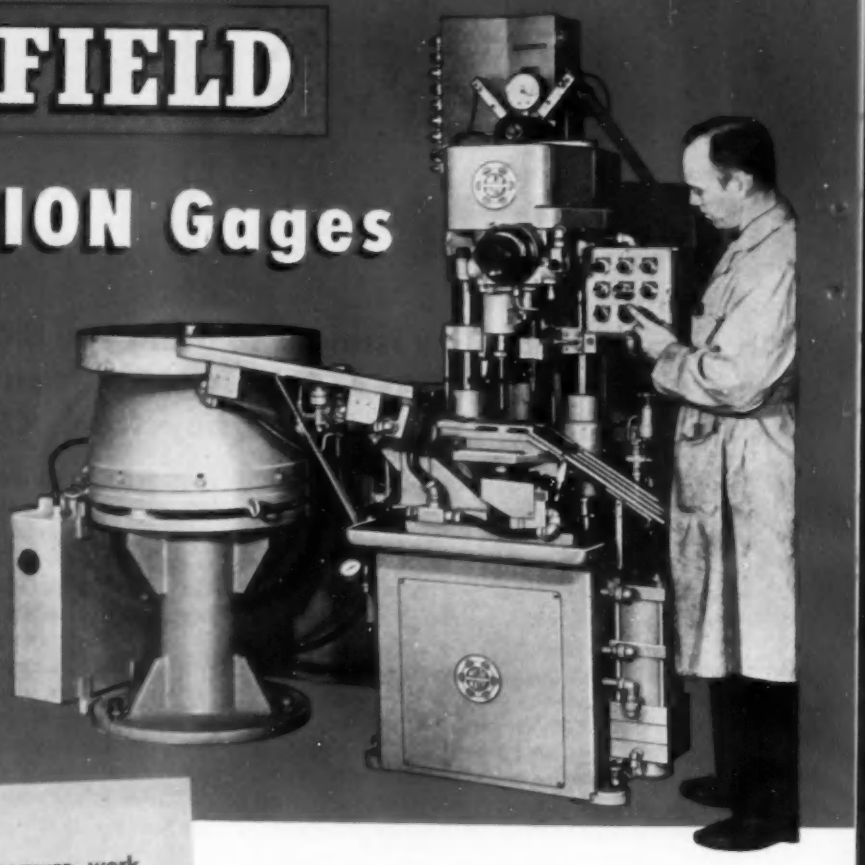
Kearney & Trecker
CORPORATION
MILWAUKEE 14, WISCONSIN

BUILDERS OF PRECISION AND PRODUCTION MACHINE TOOLS SINCE 1898

SHEFFIELD

AUTOMATION Gages

Assure Fast Accurate Machining



Sheffield Automation Gages are package units, ready-to-use and economically priced, for the control of grinding, boring, drilling, honing, milling, turning and other machining operations.

Mounted on machine tools, they measure work part dimensions and space relationships and instantly translate this information into impulses which in turn:

- Energize signal lights
- Actuate solenoid ejection or classification mechanisms
- Start and stop the machine tool
- Provide feed-back control
- Control cutting tool or grinding wheel positioning and compensation, also time cycle.
- Provide visual dimensional readings

A Typical Application

Here the bore of transmission pinions is being honed on a Micromatic Model 738 Machine and gaged automatically.

If the actual bore size, after honing, is within .0001" of either tolerance limit, white warning lights flash on.

If either tolerance is exceeded, a red or green signal flashes and the faulty part is automatically ejected.

When a predetermined number of rejects pass through in succession the machine is automatically stopped.

The actual size of each bore, as it is gaged can be read on a conveniently located air gage dial or column as built into the machine tool pneumatic circuit.

The Sheffield Corporation, Dayton 1, Ohio, U.S.A.

See us at the Machine Tool Show, Booth 1305

SHEFFIELD HEADQUARTERS

SHEFFIELD

MANUFACTURE AND MEASUREMENT FOR MARKING

Sheffield AUTOMATION ENGINEERS will gladly consult with you about automatizing your production.

ANOTHER "U. S." ENGINEERED RUBBER PRODUCT
SERVING THE AUTOMOTIVE INDUSTRY

Look to "U. S." for your ADHESIVE needs

Consider these advantages:

1. United States Rubber Company is a specialist in rubber adhesives. "U. S." provides specialized engineering service to the automotive industry.
2. "U. S." is equipped to make vast quantities of adhesives, both solvent and water-dispersion types.
3. "U. S." makes its adhesives from natural rubber, reclaim rubber, GR-S, Neoprene, and Buna-N, to provide standard or specially-compounded adhesives to handle any bonding problem encountered by the automotive industry.
4. Shipments are made quickly and at *low* freight cost from central locations.

For fast, immediate service or placement of orders, phone Trinity 4-3500 or contact the address below.

US RUBBER

"U. S." Research perfects it..."U. S." Production builds it.

UNITED STATES RUBBER COMPANY

Automotive Sales, Mechanical Goods Division, New Center Building, Detroit 2, Michigan

As the average man needs his car...

See... BAKER

at the Machine Tool Show

Chicago — Booth 1421

Come in and see the low cost general purpose special machines at work in a practical demonstration of extreme versatility at very low cost.

INCREASED PRODUCTIVITY THROUGH
BETTER MACHINE TOOLS

BAKER BROS., INC., Toledo, Ohio

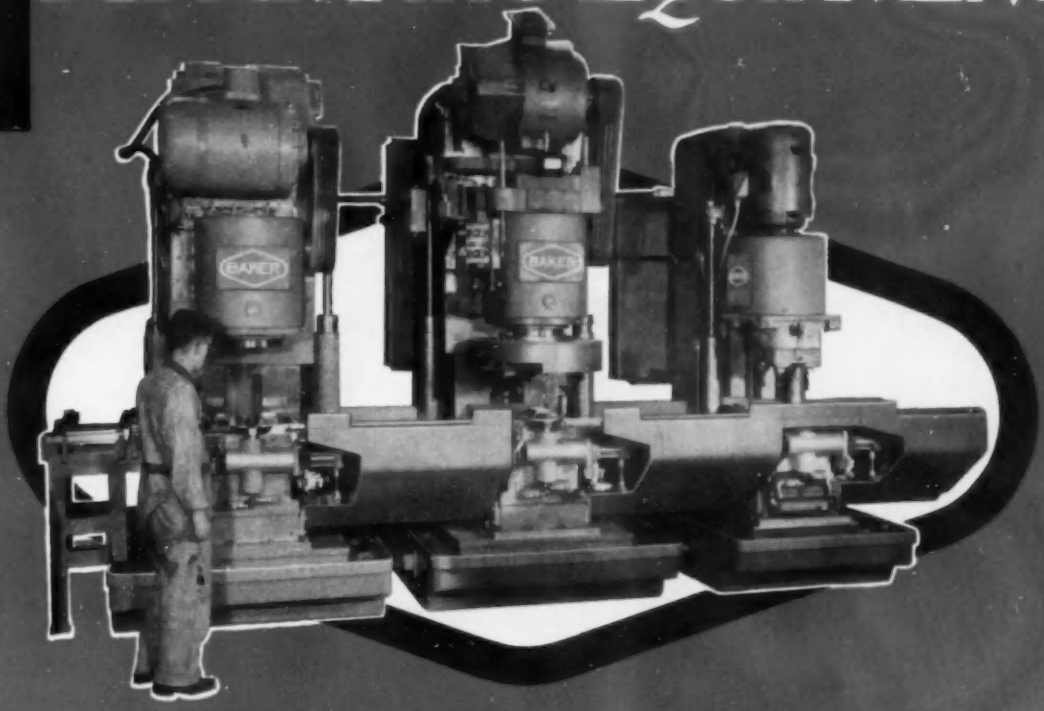
SINCE 1875

THE MACHINE TOOL SHOW
CHICAGO, ILL.
SEPT. 9-17, 1959
INTERNATIONAL AMPHITHEATRE

M T

BOOTH 1421

So the Average Shop Needs and Now Can Afford AUTOMATIC EQUIPMENT



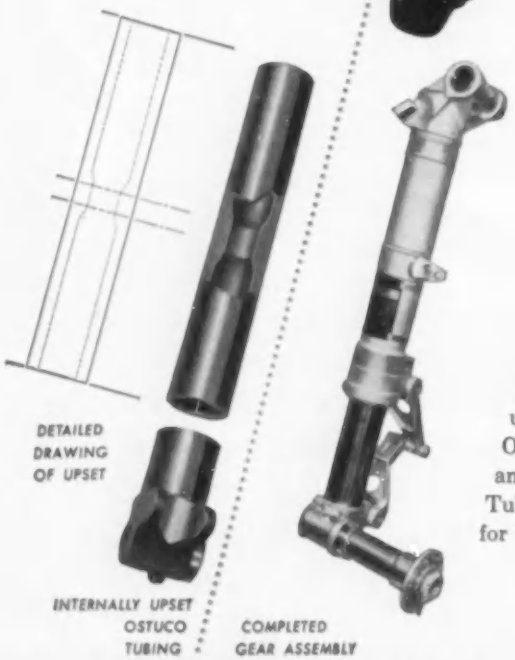
The new Baker Transfer illustrated is to be introduced at the show. The Baker will be set up with a low cost, simplified fixture and combined to operate as a transfer machine, proving the possibility of providing automatic machines through use of STANDARD MACHINES. The machines Combination Bore and Counterbore . . . Face (cross feed) . . . and Multiple Drill . . . All Automatically.

FOR MORE THAN THREE-QUARTERS OF A CENTURY...

Standard and Special Drilling...Boring...Tapping Keyseating and Contour Grinding Machines

OSTUCO internally upset tubing processes faster

Saves $4.95 per unit



DETAILED DRAWING OF UPSET

INTERNALLY UPSET OSTUCO TUBING

COMPLETED GEAR ASSEMBLY

Landing gears, manufactured by The Cleveland Pneumatic Tool Company for North American Aviation's F-86H, have piston tubes machined from internally upset OSTUCO tubing. The upset construction of these *special-quality* OSTUCO tube forgings keeps machining to a minimum and permits faster processing. Savings are 25% . . . or $4.95 per unit.

Special-quality OSTUCO tubing produces stronger, lighter products . . . better looking products at greater savings. Its uses are practically unlimited. Wherever you use tubing *in any form*, OSTUCO's single source service can save you time and money. Write for helpful booklet "Ostuco Tubing," or better still, send us your blueprints for immediate quotation.

OSTUCO TUBING

SEAMLESS AND ELECTRIC WELDED STEEL TUBING —Fabricating and Forging

OHIO SEAMLESS TUBE DIVISION
of Copperweld Steel Company • **SHELBY, OHIO**
Birthplace of the Seamless Steel Tube Industry in America
SALES OFFICES: BEVERLY HILLS • BIRMINGHAM • CHARLOTTE CHICAGO • CLEVELAND • DAYTON • DETROIT • HOUSTON LOUISVILLE • MOLINE • NEW YORK • PHILADELPHIA PITTSBURGH • ROCHESTER • ST. PAUL • SEATTLE TULSA • WICHITA
CANADA, RAILWAY & POWER CORP., LTD.
EXPORT: COPPERWELD STEEL INTERNATIONAL COMPANY 117 Liberty Street, New York 6, New York

AI

AUTOMOTIVE INDUSTRIES

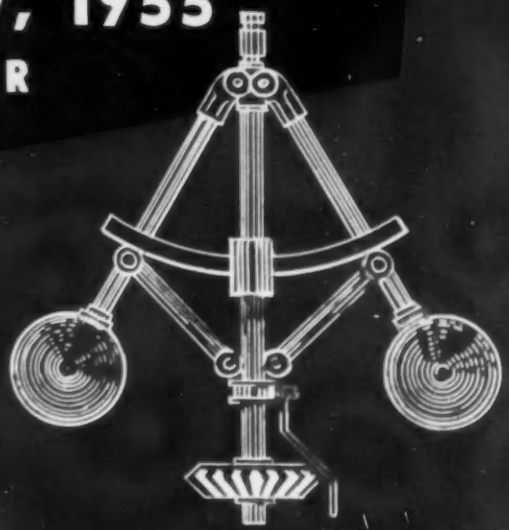
MACHINE TOOL & PRODUCTION EQUIPMENT ISSUE—1955

THE PRODUCTION ENGINEERING SHOW

CHICAGO, ILL.

SEPT. 6-17, 1955

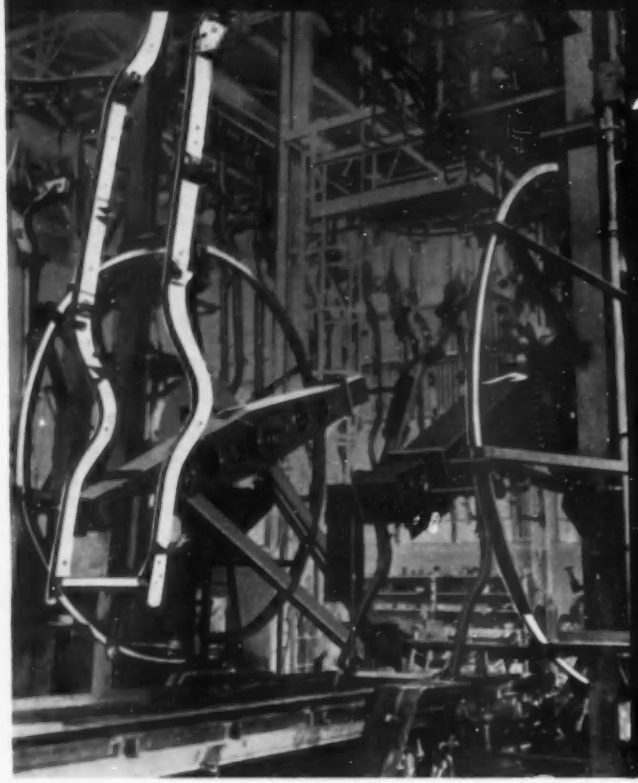
NAVY PIER



JERVIS B. WEBB

CONVEYOR ENGINEERING, MANUFACTURE, INSTALLATION and AUTOMATION

FROM SLAT TO TROLLEY CONVEYOR *Automatically*



Ferris wheel developed by Webb automatically lifts frames from assembly line and hooks them on overhead trolley conveyor.

. . . Another Example of

WEBB (R)

Automation

Located in Philadelphia is one of the country's most modern plants for producing passenger car chassis frames. It is equipped with conveyor systems that automatically carry 3,000 of the large frames a day through various assembly operations, painting and shipping.

Slat conveyors are used in assembly and shipping departments while overhead trolley conveyors carry assembled frames through washing, painting and drying.

At the end of the final assembly line, frames are automatically picked off the slat conveyor by a unique two-arm Ferris wheel device (designed by Webb) and hooked on the overhead conveyor for washing and painting. Another automatic device, built by Webb, has three trunnion-mounted arms which pick frames off the overhead conveyor after painting and deposit them on the slat conveyor in shipping room.

For automatic handling of any size or type of material, Webb engineering experience and reputation is your best assurance of receiving the finest in conveyor automation.

Visit us at "The Production Engineering Show"—Navy Pier, Chicago • September 6 to 16, 1955 • Booth 518

Write to us on your company letterhead and we will be happy to place your name on the Webb mailing list to receive factual technical information on conveyor installations, case history reports, and new product literature.

JERVIS B. WEBB CO.

Specialists in Custom Conveyor Systems

8937 ALPINE AVENUE • DETROIT 4, MICHIGAN

Offices and Representatives Throughout The World • FACTORIES: *Detroit* • *Los Angeles* • *Hamilton, Ontario*

PREVIEW OF PRODUCTION ENGINEERING SHOW

WAGNER ELECTRIC CORP.

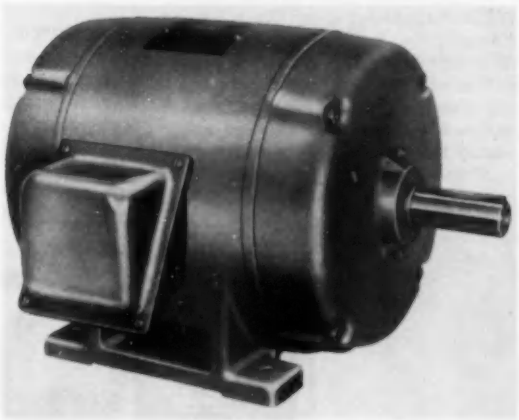
Booth 129

A line of newly designed open and enclosed polyphase, squirrel-cage motors in re-rated NEMA frames will be displayed. Also featured will be a display panel showing the operation of various air and hydraulic brakes, actuators and controls for use on production equipment.

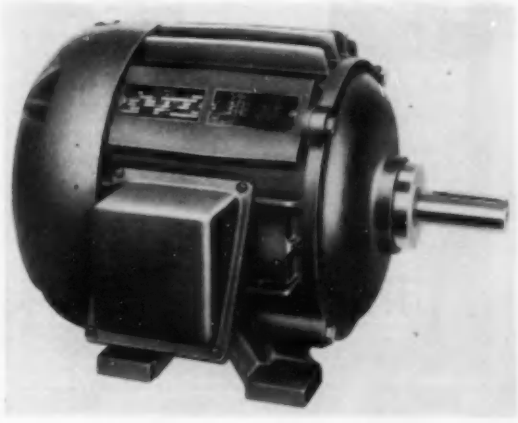
The totally enclosed, fan-cooled motor, type EP, five horsepower is designed for general industrial use where non-explosive dust and fumes, dirt, filings, abrasives, steel chips and moisture are present.

The new design, fully protected motors, type DP, five horsepower are fully protected for use indoors or out. They are of rugged, corrosion-resistant cast-iron construction and doubly protected by a drip-proof enclosure. Air outlets are located at base of frame, and especially designed baffles direct cooling air from the blowers through the motor and provide protection for the stator windings.

Circle 121 on postcard for more data



Wagner Electric Corp. new design, fully protected motor, type DP, five horsepower., 215 frame.



Wagner Electric Corp. totally enclosed fan-cooled motor, type EP, five horsepower, 215 frame.

CHICAGO DIAL INDICATOR CO.

Booth 525

A line of precision instruments will be shown. Among the instruments will be the Geneva dial indicator, dial indicator test set, bench center set, test set with magnetic base, regular test sets, bench gages, dial snap gages and depth gages.

Features of these dial indicators include the continuous reading for 0.001 in., 0.0005 in. and 0.0001 in. graduations, and threaded stems for fitting bases and fixtures to gages in order to adapt them to special checking jobs. The special lever movement gives direct readings by means of lever arms. Of interest are the magnetic base holders on these indicators, which attach with a 100 lb pull to flat or curved surfaces. Most of these test sets, indicators and gages are available with jewel bearings.

Among the units to be shown will be the bench center, which has a tip-over upright providing a convenient support for the indicator. A bench gage designed for quick production checking of parts in small or large quantities will also be shown. Dial snap gages which are easily adjustable to make exacting comparison between work pieces are available in different models and sizes.

Circle 122 on postcard for more data

FIRTH STERLING, INC.

Booth 837

The exhibit will feature a line of high speed steels, tool and die steels, stainless specialties, and high temperatures alloys, as well as Firthite (sintered tungsten carbide) tips, blanks, tools, dies, and wear parts.

Prominently displayed will be the new Thriftool, an inexpensive mechanical toolholder. It consists of a toolholder shank, a simplified clamp, and throw-away carbide inserts. Available in five styles, and a wide range of sizes, the new Thriftool is said to

be the first low-cost throwaway tool. With regrinds permitted on six edges of the insert before the tool must be discarded, its cost is less than a standard milled-and-brazed tool of the same style and size.

Completing the exhibit will be newer products, primarily aimed at high temperature and corrosion resistant applications, chromium carbide, heavy metal, zirconium and cermets.

Circle 123 on postcard for more data

STANDARD PRESSED STEEL CO.

Booth 828

A new line of super-strength socket head screws that may be turned 40 per cent tighter than ordinary ones,

The new line of high-torque Unbrako set screws can be torqued up to 40 per cent tighter.

will be displayed. The company also will be exhibiting for the first time Hallowell storage wall units, nests of drawers for small items which can be built brick-fashion against a wall or otherwise to form a utilitarian partition between work areas, and a line of Flexloc micro nuts, tiny lock fasteners, designed primarily for instruments and electronic devices.

The new high-torque set screws, available in conventional diameters from Number 0 to 1 in. diameter, have fully formed precision threads, deeper sockets, harder socket walls, harder, tougher, self-locking knurled point.

The Hallowell storage wall units, which SPS will display, are made up of rugged steel cases which accomodate three rows of drawers in one instance and four rows in another. The drawers, designed to hold small items such as drills, gages, telephone parts, test specimens, etc., come in a variety of sizes. Because of planned interchangeability, drawers of a single size or drawers of different sizes can be used in the unit cases. The cases, dimpled bottom and top at all four corners, can be fitted snugly one on top of the other and bolted into a strong, stable wall.

The third new product, the Flexloc micro nut, is made of brass or aluminum and can be had either plain or cadmium-plated. The fastener, which comes in sizes 0-80, 1-64, 1-72, 2-56, 2-64, 3-48, 3-56, 4-40, and 4-48, is a one-piece, all-steel precision product which functions as a stop nut as well as a locknut. They lock and stay locked regardless of vibration and can be removed and used repeatedly without loss of locking effectiveness.

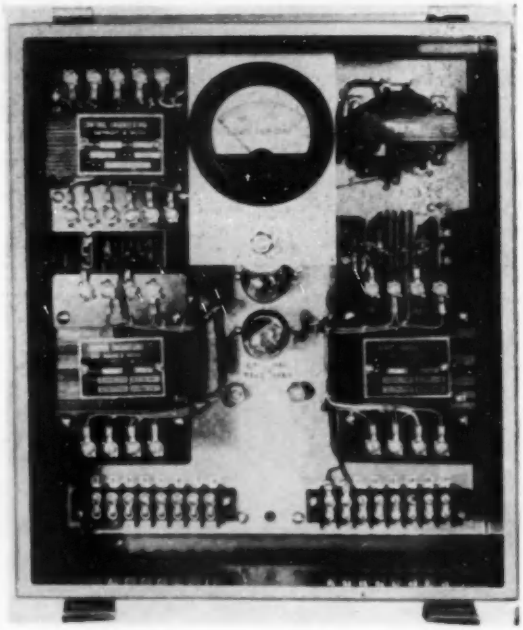
Circle 124 on postcard for more data

JERVIS B. WEBB CO.

Booth 518

An electronic load control, Model LCSR, manufactured by Control Engineering Co., a subsidiary of Jervis B. Webb Co., will be on display, as well as photographs, motion pictures and slides of various types of automation equipment, also catalogs and related literature.

Circle 125 on postcard for more data



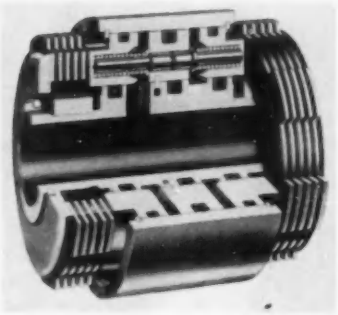
Model LCSR electronic load control

TWIN DISC CLUTCH CO.

Booth 103

The first standardized oil-actuated multiple plate clutches for general industrial use will be displayed.

The Models MOS (single) and MOD (duplex) oil-actuated multiple plate clutches incorporate certain distinct design advantages which are of particular interest to the machine



Twin Disc Clutch Co. oil-actuated multiple plate clutch for general industrial use.

tool user. These units are the answer for a high energy, high inertia, high horsepower clutch especially adaptable to applications creating high temperatures and operating under heavy loads.

Both models are readily adaptable

to remote or push button control without complicated linkage. Since the floating or pressure plate forms the ram of the cylinder, the ram travel increases automatically as the plate stack wears. This eliminates adjustments to compensate for plate wear and constant torque transmitting ability is thus provided during the entire life of the clutch plates. In addition to these two clutches, a complete line of friction and fluid drives will be presented.

Circle 126 on postcard for more data

NATIONAL DIAMOND LABORATORY

Booth 551

A complete line of diamond wheel dressing tools will be shown. The diamonds are set in a bond containing titanium hydride. These diamond tools are available for crankshaft regrinders, valve seat regrinders and cam shaft regrinders, valve face and reseat regrinders.

A line of industrial diamond wheels and hones for tungsten-carbide tipped tools will also be shown.

Circle 127 on postcard for more data

WILSON MECHANICAL INSTRUMENT DIV.
AMERICAN CHAIN & CABLE CO.

Booth 118

Latest advances in hardness testing, including a fully automatic Rockwell machine that is being successfully used in industry for quality control checks, will be featured.

By the use of tiny photo transistors and intricate timing mechanisms, the fully automatic Rockwell machine is capable of testing the hardness of both ferrous and non-ferrous metals, in hard or soft condition, at the rate of 1000 to 1200 tests per hour. Manual testers generally average 200 to 400 tests in the same period.

In the automatic operation, the parts to be tested are power fed into the machine and placed into position beneath a diamond penetrator. Testing loads force the diamond into the part to determine the hardness of the material. The resulting hardness determination, while it can be read on a dial, is used to automatically classify and sort the part according to desired hardness limits. The work then may be distributed for further processing or use, or returned for salvage or reprocessing.

The photo transistor circuit can be set to control the hardness limits as close as two points. In addition, this new Rockwell tester regulates the vertical travel of the elevating screw so that the machine can automatically test pieces of varying thickness.

Another featured unit will be the Rockwell motorized hardness tester which is semi-automatic in operation. This device features a short test cycle to permit an increased number of Rockwell readings to be taken and recorded within a definite time period. A special dial gage, designated as Set-O-Matic, eliminates the necessity of the operator setting the dial bezel for each test.

The Wilson Mechanical Instrument Division will also display its regular line of hand-operated Rockwell and superficial Rockwell testers, the Tukon micro-hardness tester, and accessories for all models, including the Equitron fixture, which is used for holding pieces that are being tested for Jominy hardenability.

Circle 128 on postcard for more data

INDUSTRIAL DIAMOND ASSOCIATION

Booth 139

Illustrations of manufacturing processes, utilizing industrial diamond tools and products, will be displayed. Increasing interest has been shown by the industrial and non-technical press regarding the growing importance of diamonds in industry and the resultant reduction in manufacturing costs. There will also be a showing of various types of diamond tools and wheels, and of illustrated literature on the care and maintenance of diamond tools.

An added feature will be a display of diamonds from the mine to the finished tool. Also on exhibit will be industrial diamonds of many kinds and sizes, as well as illustrations of diamond mining, and replicas of celebrated gem stones in history.

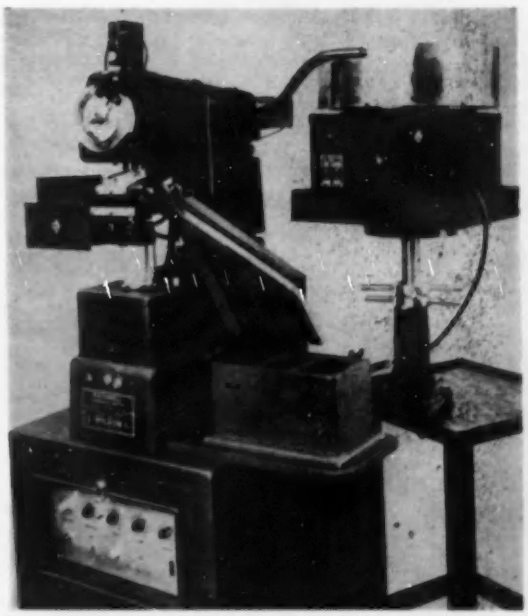
Circle 129 on postcard for more data

BARRETT-CRAVENS CO.

Booth 452

The Guide-O-Matic industrial tractor or truck eliminates the operator. It brings real automation to materials handling. It starts, moves and stops by means of radio signals, transmitted through a guide wire, strung either overhead or embedded in the floor. A "sniffer" box, mounted in front, picks up waves from the guide wire. The electronic brain in the box causes the tractor train to follow the route set by the guide wire to the desired destination. It follows its path closely, within plus or minus ½ in.

The radio signals, to control the tractors, are transmitted over the wires from signal boxes, installed throughout the plant. To call a truck, one presses a button, and the truck



Automatic Rockwell hardness tester with vibratory feed can test 1000 to 1200 ferrous or non-ferrous metals per hour. After testing the parts are routed into bins, marked HARD, GOOD and SOFT. Colored lights, mounted above the dial, show the classification of each part as it is tested, a monitoring aid for production operators and supervisors.

will come immediately. When a Guide-O-Matic returns to the central parking area, it automatically couples itself to a charging receptacle. No attendant is needed.

The company also has available a radio remote controlled tractor unit, called the Radox tractor. In a warehouse, it is operated by the order filler from a control box in his belt. He does not need to approach the tractor to start, steer and stop a trailer train.

Circle 130 on postcard for more data

LINK-BELT CO.

Booths 433-5

The company's complete line of power transmission and conveying equipment will be shown. Of special interest will be a running unit composed of three P. I. V. variable speed drives, including one with hydraulic controls, one with electronic controls and one with pneumatic controls. All three P. I. V.'s are synchronized, to demonstrate their flexibility. Link-Belt's new ball bearing trolleys for overhead conveyors, known as Series 500, will also be exhibited.

In addition there will be displays of Link-Belt's ball and roller bearings, babbitted bearings and takeups, including the new "DS" model. Roller and silent chain, locknuts and washers, RC and geared flexible couplings and worm and parallel shaft gear drives will be available for inspection.

Also to be seen will be four conveyors. They are: a Flexmount oscillating conveyor, a screw conveyor, a piano-hinged apron conveyor and a drag chain conveyor, all applicable to many chip and scrap handling problems.

Circle 131 on postcard for more data

PARKER APPLIANCE CO.

Booth 415

A handy tube burring tool is the newest addition to the Parker line of tube working tools. Named the "In-Ex", because it can be used for internal and external burring, the tool will handle copper, brass, aluminum alloy or annealed steel tubing in sizes from 3/16 to 1½ in. OD. Conical arrangement of the cutting blades makes tool self-centering.

New items include swivel adapters in a straight connector and both 45 and 90 deg elbows, and brass reusable fittings for low pressure fiber

Parker tube burring tool

braid hose. A new tube working tool "Torkgrip" for non-slip tube bending will also be introduced.

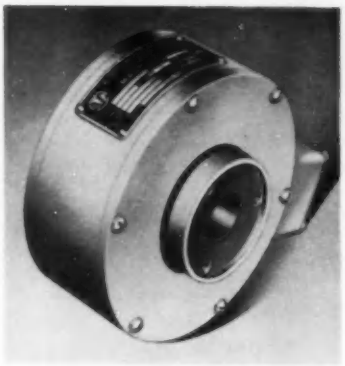
Tork-grip is a convenient tool for easy, efficient bending of copper, brass, aluminum and annealed steel or stainless steel tubing of normal wall thicknesses. It is said to produce accurate bends, without wrinkling or perceptible flattening.

Circle 132 on postcard for more data

VICKERS ELECTRIC DIV. VICKERS, INC.

Booth 544

A new 50 lb-ft Magnebrake, magnetic-particle brake will be demonstrated. The inherent characteristics



Vickers Electric Div. 50 lb-ft Magnebrake

and advantages of this new magnetic-particle 50 lb-ft brake are the same as those of all Vickers magnetic-particle brakes and clutches—long life, smooth operation, accurate control, fast response, and large ratio of power controlled to controlling power. Outstanding performance characteristics of this brake make it well-suited to industrial braking applications.

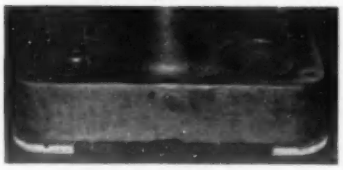
Circle 133 on postcard for more data

CLARK-CUTLER-McDERMOTT CO.

Booth 251

Anti-vibration machine pads, "Air-Loc 4-17-4" requiring no cementing or bolting, and applicable to light or heavy machinery, from 100 lb to 100 tons, will be shown.

Because of its ease of installation, its 1000 psi load-bearing capacity, its

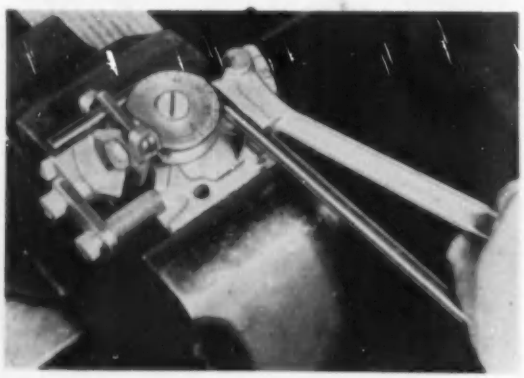


"Air-Loc" pads under milling machine

vibration reducing capacity of 85 per cent due to its low natural frequency of 18 cycles per second, it has wide application on machine tools of all types, punch press, shears, and stamping machines.

Made from cork, sisal and Bakelite vinyl resin, Air-Loc's embossed surfaces anchor machines by a high coefficient of friction. This not only absorbs vibration, but prevents re-transmission of vibration from floor to machine and cuts down noise level.

Precision leveling is accomplished



The Tork-grip tool for non-slip tube bending easily handles stainless steel tubing and has close-bend features.

by using 9/16 in. Air-Loc 4-17-4 with the thinner ¼ in. Air-Loc S.L., and shimming between the two, thus locking the machine in place and giving every machine adjustable leg versatility.

Air-Loc's outstanding qualities will be demonstrated with an unbalanced, wildly vibrating machine, an oscilloscope, and a hydraulic press.

The high load bearing characteristics are impressed on the spectator by pumping 20 tons of force on an 8 by 5 in. piece of Air-Loc in a hydraulic press. The lack of permanent set under this 1000 lbs. psi load becomes immediately evident by spectator comparison with original pieces.

Circle 134 on postcard for more data

OAKITE PRODUCTS, INC.

Booth 652

A new material designed to strip zinc chromate primer from aluminum; a new acidic barrel finishing compound; and an alkaline derusting and heat scale removing compound will be featured.

Oakite Products will also exhibit materials for tank, barrel, machine, electro and steam cleaning; machining and grinding; pickling; rust prevention and removal; paint stripping; and paint spray booth water treatment, as well as the Oakite CryCoat processes for iron and zinc phosphating.

Circle 135 on postcard for more data

MAGNAFLUX CORP.

Booth 820

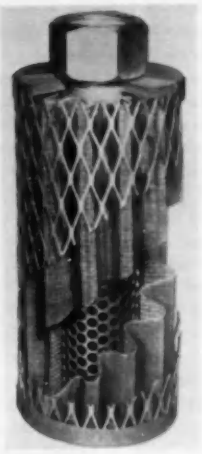
As a manufacturer of non-destructive testing equipment, this exhibitor will feature a working demonstration of what non-destructive testing can do for the manufacturer, rather than how it is done. Therefore, the booth will not feature new inspection equipment, techniques or materials, but will be a working demonstration of the Magnaflux magnetic particle inspection, showing potential dollar value of an inspection to manufacturers.

Circle 136 on postcard for more data

MARVEL ENGINEERING CO.

Booth 809

The sump and line type of Synclinal filters are designed for installation either in the sump or on line, preceding the pump on all hydraulics and other low pressure circulating systems



Marvel Synclinal sump type filter

for the filtration of hydraulic oils, coolants, lubricants and water. Both sump and line type filters are available in eight individual five to 100 gpm capacities. Also included in the exhibit will be a simulated pumping unit, displaying a typical installation of both types of filters under actual working conditions.

Circle 137 on postcard for more data

BRISTOL CO.

Booth 640

A new, multiple spline socket set screw, for highly specialized guided missle assembly, is broached all the way through, so that the screw may be wrenched from either end, thus speeding up assembly. The screws may be fed from an automatic feed line, with either end up, by automatic assembly methods.

The new socket screw (or locking ring), is available only in No. 8, 0.072 in. size, with cadmium plating, but may also be furnished in other diameters and lengths.

A complete line of socket head cap and set screws in sizes from No. 4 (0.112 in.) down to No. 0 (0.060 in.) is offered as standard items for the first time. A full range of small size socket screws is offered in both 18-8 stainless and heat-treated alloy steel, in a variety of lengths and threads.

The socket screws are available in either hex or the multiple spline sockets. The line includes hex socket flat head cap screws, pipe plugs and stripper bolts (shoulder screws), in addition to the cap and set screws with cone, flat, oval, half-dog, or cup points.

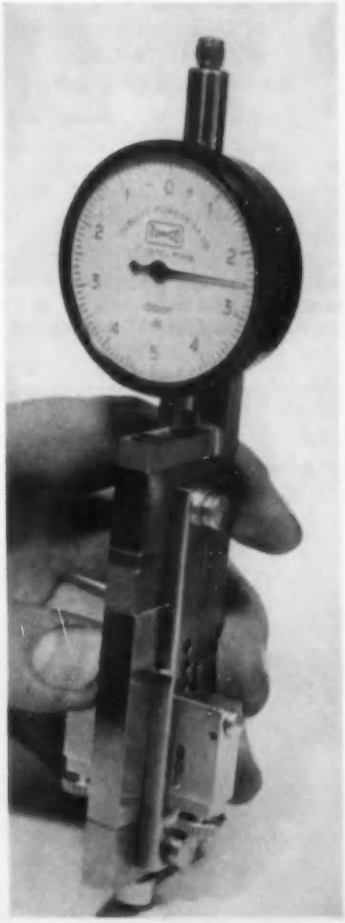
Circle 138 on postcard for more data

THE DoALL CO.

Booth 407

DoALL will feature its gage blocks, gages, cutting tools and industrial supplies. Micro-Step, a patented system for assembling rectangular blocks into fixed or indicating gages of every type and description, will be in constant demonstration. DoALL's new square gage blocks (in addition to rectangular blocks) and square gage block accessories for assembling working gages, will also be on display for the first time.

Exclusive distributor for Bausch & Lomb contour measuring and bench projectors and toolmakers' microscopes, DoALL will have these instruments on hand. Other items, such as tubular micrometers, plug and ring gages will also be included. One of



Indicating gage for inside dimensions Bristol "Double Header"

the most extensive displays of granite surface plates and accessories will be part of this gaging section.

Small tools and gages will also be displayed at the other DoALL exhibits and educational demonstrations such as "drilling pointing" will be conducted.

Circle 139 on postcard for more data

ALEMITE DIV. STEWART-WARNER CORP.

Booth 416

A full range of Alemite Accumeter centralized lubrication systems, Oil-Mist automatic lubrication, hand guns and loader pumps, bucket and transfer pumps and portable power guns, power operated barrel pumps and Lubrikarts will be shown.

Circle 140 on postcard for more data

MICROMETRICAL MANUFACTURING CO.

Booth 651

The type GK tracer is designed especially for taking surface roughness measurements in small holes, narrow grooves and slots, and on small parts (or small areas on larger parts)—particularly where the dimensions involved are less than ¼ in. It is also used for measuring on small gear teeth, and on internal and external tapered surfaces where the part can be mounted with the work surface approximately horizontal.

The tracer point has a range of vertical travel of 0.030 in., permitting roughness measurement across curved surfaces where the chordal height does not exceed 0.025 in. To permit entering small apertures, this tracer has no skids and the tracer point is at the end of a long, narrow beam. Because of this construction, the tracer must be supported and moved mechanically by a Linear Pilotor.

At the 0.1 in. per sec tracing speed, provided by the Linear Pilotor, surface irregularities with peak-to-peak spacing greater than 0.010 in. are not measured. The GK tracer can be used only with a Linear Pilotor. It can be used with any Profilometer Amplimeter.

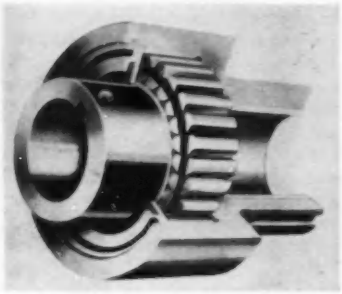
Circle 141 on postcard for more data

FORMSPRAG CO.

Booth 432

In the basic construction and operation of the Formsprag over-running clutch, torque is delivered from one concentric race member to the other through a full complement of sprags, energized by springs. Torque, applied through the driving member, engages the sprags between driving and driven member. Removal of torque instantly releases all sprags.

Shown for the first time will be three new series of clutches and a new clutch coupling unit. The new small unit meets an increasing demand for a small clutch with high torque capacity and long life with minimum maintenance. The new large bore clutch was designed for backstopping applications requiring large-bore sizes. The Series 50 clutch was developed for applications where adequate inner race concentricity is provided. It is particularly useful where the backstop can be incorporated into a bearing bore and an existing shaft extension serves as an inner race.



Cutaway view of Formsprag clutch.

For applications requiring an over-running feature when coupling two shafts, the company has developed a clutch-coupling unit to cover the complete range of operating conditions.

Circle 142 on postcard for more data

HAMILTON AUTOMATION

Booth 810

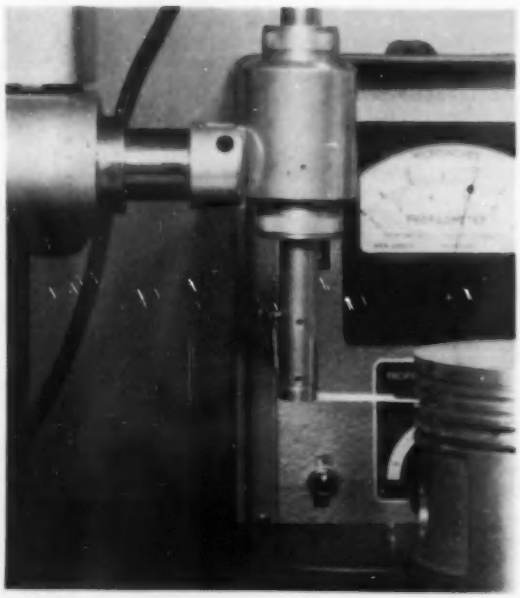
The Automatic Shuttle Hand will feed, pull or shuttle parts into dies or welder at a minimum speed of 18 spm and, when used with the Robot Panel, is fully automatic.

All valves and electrical controls are self-contained, air-operated with speed control valves, 110v-60 cycle controls, hardened ways, needle bearings throughout, mounted on swivel casters, clevises to anchor to the die. Unit is equipped with one standard jaw and one set of index bars.

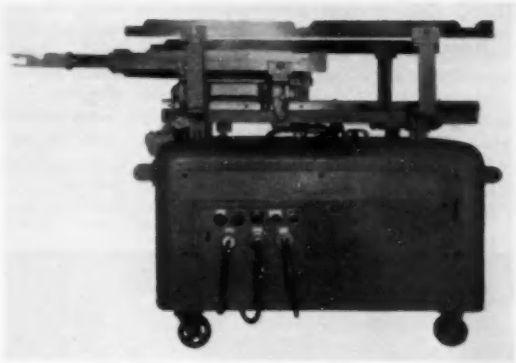
The Robot Panel with press switch slide is wired to trip the shuttle hand and to protect the die and press. A part must come out of the die and a new part go into the die and all units back to a safe position before the press can make a stroke, but it trips the press automatically, taking control of production out of the operator's hands.

Operates on 110v-60 cycle current, 100 lb air pressure. When using this Robot Panel, it is unnecessary to tie into the press circuit.

The Automatic Press Hand can be



Slug Micrometrical Mfg. Co. Measuring roughness of grooves with type GK tracer.



Hamilton Shuttle Machine

used to pull panels from dies; feed sheets into dies, or many other applications. Almost any part, that can be pulled by hand, can be pulled with this unit.

The standard machine will operate as follows: 24 in.-30 spm, 36 in.-28 spm and the 48 in. machine at 26 spm.

The standard machine is equipped with one standard jaw, air-operated with speed control valves, 110v-60 cycle controls, hardened ways, needle bearings throughout, mounted on swivel casters, with clevises to anchor to the press.

Circle 143 on postcard for more data

EQUIPTO DIV. AURORA EQUIPMENT CO.

Booth 440

A new line of Modern Flow steel lockers, combining modern styling, easy assembly, and rugged construction will be shown.

The Modern-Flow line features a new sliding channel construction that saves 80 per cent of assembly time by eliminating need for nuts, bolts, or tools, according to report. Angle reinforced doors have four-point latching mechanism, and locking attachment to make them pilfer-proof.

The new Modern-Flow lockers are available in single and double tier types, in standard sizes and may be lined up in matching assembly.

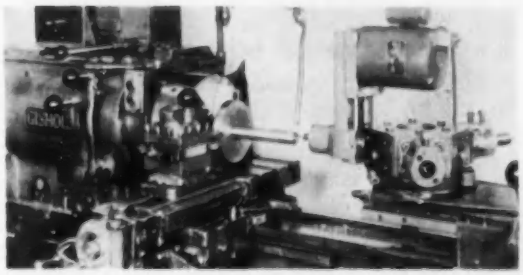
Circle 144 on postcard for more data

E. F. VILTER CO.

Booth 456

The Tru-Hole Speedy drilling attachment has been designed to reduce the drilling time required with turret lathes and hand screw machines. A time saving up to 50 per cent and reduction in drill breakage are claimed for this attachment. The increased drill speed (machine plus attachment rpm) results in faster drilling of deep holes and much less drift of the hole. It may be used with all types of machines. On machines with hollow turret, the knock-out rod may be left in the tail of the unit and the knob will be in the hollow turret where it is readily accessible. The Tru-Hole Speedy drilling attachment is regularly furnished with three speeds. The spindle has a No. 2 Morse taper hole with tang drive; the entire unit is supported from the mounting shank. Maximum capacity is ⅜ in in steel.

Circle 145 on postcard for more data



Tru-Hole Speedy with center drill.

STACKBIN CORP.

Booth 448

Stackbin-Stackrack combinations let materials be carried throughout processing without transferring contents to another container. Stored in Stackracks, each Stackbin is instantly accessible. Hopper front Stackbins are open in front and facilitate removal of materials. Interstacking feature assures efficient use of floor space. With adapters, smaller bins may be stacked on larger units. Seven sizes are available and individual units lock together in any arrangement, without the use of tools.

Circle 146 on postcard for more data

AMPCO METAL, INC.

Booth 516

The display will consist of Ampco metal, a series of special copper-base alloys and the forms in which they are available—sand and centrifugal castings, "C" process castings; mill products—extruded solid and hollow rounds and shapes, sheet and plate, tube, forgings and fasteners. Parts finish machined from these materials will be shown. Ampco-Trode, Phos-Trode, Mang-Trode bronze welding rods in coated, coiled and filler rod forms and their applications in production jobs; Ampco-Weld resistance welding bars and rods, tips, wheels and accessories and Ampco centrifugal pumps used for moving corrosive media in production operations will be displayed.

Circle 147 on postcard for more data

GRAHAM TRANSMISSIONS, INC.

Booth 540

A new worm reducer assembly is now available as standard equipment with the Graham infinitely variable speed transmissions in the ⅛ and ¼ hp sizes. This reducer can be furnished with double output shaft extension, or single shaft extension horizontal or vertical, up and down. Several worm ratios are available in-

Graham infinitely variable speed transmission

cluding 5:1, 12:1, 23:1, 45:1, and 60:1 providing a ranging of speeds from 550 rpm to zero to 10 rpm to zero.

The entire assembly of reducer, variable speed transmission and motor is mounted with four bolts, reducing installation costs and making a compact assembly.

Speeds from maximum to zero are obtainable by turning the handwheel. The micrometer type control is standard equipment and makes for accurate resetting. Other features of the transmission include built-in overload protection, straight-line speed adjustment with equal changes in speed for equal changes in dial setting, wide choice of built-in motors, including explosion-proof and many types of controls, remote electrical, pneumatic and hydraulic.

Circle 148 on postcard for more data

S-P MANUFACTURING CORP.

Booth 115

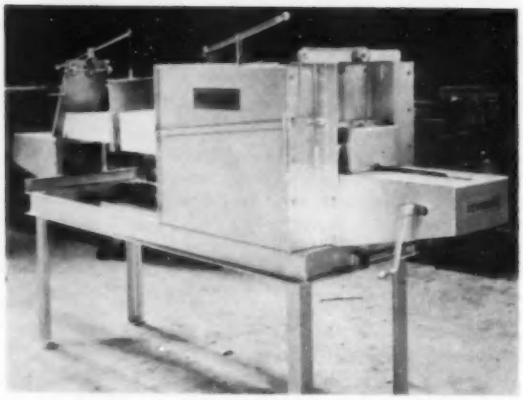
A complete new line of air cylinders, of square end, space-saving design, as well as power chucks, air hydraulic cylinders will be shown. The new S-P air cylinders are available in 11 bore sizes from 1½ in. through 14 in. and with 21 types of mountings. They are designed to J. I. C. Standards and feature brass tubes to eliminate corrosion, removable bronze cartridge containing wiper and rod packing, and cold rolled steel end plates. The chrome-plated rod has four wrench flats and is available in optional sizes. Pistons and tie rods are secured with lock nuts. On cushioned models, cushions float on an O-ring for accurate self-alignment, providing excellent cushioning characteristics. These cylinders can be supplied with either single or double rod ends.

Circle 149 on postcard for more data

HEVI DUTY ELECTRIC CO.

Booth 252

A conveyor furnace, specifically designed for brazing, sintering and bright annealing, will be displayed. A prepared atmosphere, piped into the gas-tight muffle, protects the work from scaling and oxidation. The furnace is so constructed that temperature uniformity in the work chamber is maintained. The work is conveyed into the heating chamber where it quickly reaches specified temperatures and then moves into the water-jacketed cooling chambers. The furnace is rated at 13 kw with inside muffle dimensions of 8 in. wide, 24 in. long and 5 in. high. Other items on display will be a complete line of control circuit transformers, used in control panels of machine tools.



Conveyor furnace for brazing, sintering and bright annealing.

Circle 150 on postcard for more data

SYNTHANE CORP.

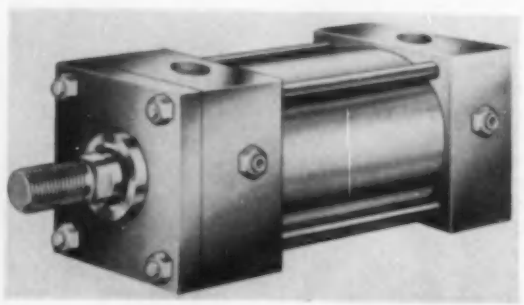
Booth 142

Three new grades of thermosetting laminated plastics, utilizing a DAP (diallyl-phthylate) resin base will be shown. Developed to solve a number of problems, involving moisture, the new laminates show promise in electronic devices and precision instruments, especially in military components for use in humid climates.

The new grades are coded according to filler material. DAP-impregnated canvas (Grade C-104), Orlon (Grade O-104), and woven glass cloth (G-104) show outstanding electrical properties in laboratory tests. Pricewise, C-104 is the most economical. Due to its canvas filler, C-104 is easily machined and has a high degree of dimensional stability. Grade O-104 is outstanding in that power factor and dielectric constant show little change after NEMA water immersion tests. Grade G-104 possessed the best electrical properties in dry condition as against other DAP grades, but a somewhat higher rate of change when subjected to moisture.

Maximum operating temperatures vary slightly between grades. Laboratory tests are said to indicate that Orlon DAP will withstand continuous temperatures of 225 F; canvas 275 F, and glass fabric 325 F without affecting either the mechanical or electrical values.

Circle 151 on postcard for more data



Air cylinder with square ends.

TRABON ENGINEERING CORP.

Booth 422

Trabon lubricating systems for grease and oil are adaptable to practically all types of machine tools; some will be circulating oil setups. The systems are powered by either motor driven or hydraulic pumps, tied into the hydraulic system on the machine; or air-operated pumps; or mechanically driven pumps, actuated by some moving part on the machine.

Circle 152 on postcard for more data

(*Turn to page 302, please*)

(Advertisement)

Report to Cylinder Users . . .

Here at Miller Fluid Power we have a pattern which we follow. A goal at which we are shooting. The pattern isn't too simple. And the goal isn't an easy one. But we've been making progress. Our position right up in the van of the industry proves that.

Our job is the production of cylinders. Basically, there's nothing anyone can do to alter a cylinder. It was old a hundred years ago. It probably won't change basically in another hundred years. But in the details of the cylinder, change is the major element.

Which is very much like industry itself. Basically industry has not changed since free enterprise was conceived on this continent. But in every detail it changes from year to year.

It's the Thousandths That Count

There was no single big thing wrong with the cylinders being manufactured yesterday. Just a lot of little things. So Miller Fluid Power made the improvement of little things its business.

We experimented with new materials and made safer, more dependable steel heads and caps. We hard-chrome-plated 110,000 PSI yield point steel to improve radically the piston rods. We raised the efficiency of operation to new peaks. Striving for quality in the smallest detail we improved in a dozen parts which are hidden from sight.

For instance, most cylinders leaked in operation. Miller made one that wouldn't leak. To prove it, we went away out on a limb and guaranteed leak-proof operation. And made the guarantee stand up.

We Learn by Listening to You

We saw our customers as thousands of men in thousands of shops wrestling with thousands of production problems. We made those problems ours and produced cylinders to whip those problems. Maybe we didn't revolutionize the cylinder business in the process. But we sure helped. We know that.

We learned to produce what we believed was the best cylinder on earth. We also learned that the best cylinder today wouldn't be good enough tomorrow. So, with the good one in production, we listened some more, experimented, and came up with a better one.

Miller Fluid Power is a young company in an old field. We are young, progressive, and willing to listen. We innovate without being prodded.

Discussion is a Two Way Street

On occasion we like to have others listen to us. Especially when what we have to say will help our customers. That is the idea behind our College of Cylinder Knowledge. We know a lot about cylinders. Though not as much today as we will tomorrow or the day after.

In our College of Cylinder Knowledge we try to show you what good cylinders can do for you. And what you should demand in any cylinder you buy. We meet other men who know what they want in a cylinder. We listen to their wants and try to explain what perfection in detail means.

We believe that when the users of cylinders sit down across the table from the producer who is trying to make the best, better cylinders result.

We'll be carrying that belief into the Production Engineering Show at Navy Pier in Chicago on September 6. Our College of Cylinder Knowledge booth will be open for that kind of discussion. We'll listen and learn.

The only way we can learn is from you. We can help you. But not until you've dropped that problem of yours in our lap. Your problem contains the stuff of which the better cylinder will be made. The cylinder that will have that quality plus which we like to think is the stamp of Miller Fluid Power.

Remember this when you see the sign over Booth 1819-23. We'll be there to listen to your suggestions, demands and questions. Also, because we are in the cylinder business, we'll be there to show you a cylinder you will want to buy.

Visit Miller

BOOTH #1819-1823

Production Engineering

NAVY PIER **SHOW** CHICAGO

Frank Flick

President

MILLER FLUID POWER COMPANY

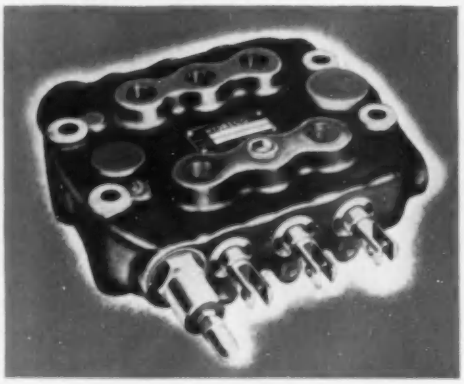
2028 N. Hawthorne Avenue

Melrose Park Illinois

PUMPS
MOTORS
ENGINEER'G
VALVES
CYLINDERS

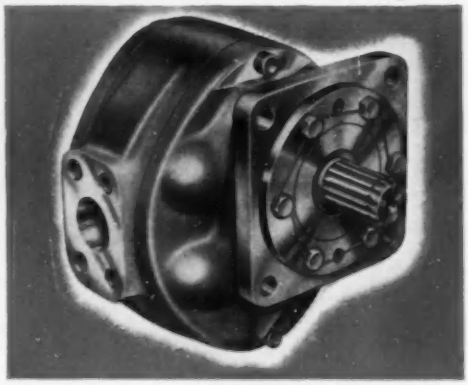
ACCEPT AN UP-TO-DATE FILE ON THESE AND OTHER NEW HYDRAULIC DEVELOPMENTS!

It is certainly true of today's engineering that *"the race is to the swift"*. Advances in hydraulic equipment made by The New York Air Brake Company are too broad and too important to trust in outdated data . . . you need the latest information on the latest developments to keep abreast of the times. New pumps, new motors, new valves and new cylinders . . . many of which dramatically affect design and performance concepts . . . are a MUST for your ready reference today. Brochures, data and engineering aid for your present or projected hydraulic circuits are now available.



HYDRECO HOLLOW-PLUNGER CONTROL VALVES

The advancements made by HYDRECO engineering in multiple plunger, single and double acting control valves bring you new, accurate throttling . . . smooth, positive, fingertip control with notable freedom from binding, chattering or troublesome back pressures. Valves with 1 to 6 plungers in capacities from 5 to 100 gpm and operating pressures of 1500 psi are now available for your present and projected equipment.

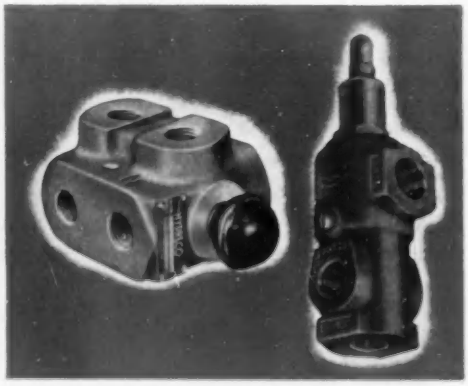


HYDRECO GEAR-TYPE PUMPS 1000/1500 psi

HYDRECO engineers have shattered the illusion that "any gear pump is just a gear pump". New developments in the famous HYDRECO Four-Bolt design provide higher pressures, higher speeds and higher efficiencies than were previously available. You'll want to know more about the many Heavy Duty features in HYDRECO Pumps. A full range of sizes—3.3 to 120 gpm at 1200 rpm.

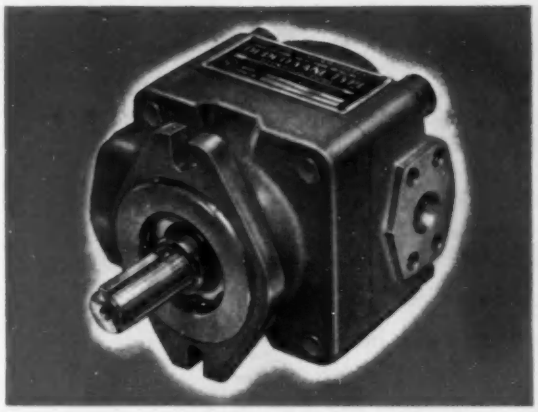
HYDRECO FLUID POWER MOTORS 1000 psi

For the many applications which call for reversible rotary motion with high starting and running torques . . . HYDRECO Four-Bolt, Gear-Type Fluid Motors are the economical and reliable answer. Precision, ruggedness and simplicity combine to ideally suit these motors to machine tools, oil drill rigs, conveyors, agitators and a thousand other uses. Sizes 3 to 52 hp at 2000 rpm, 1000 psi.



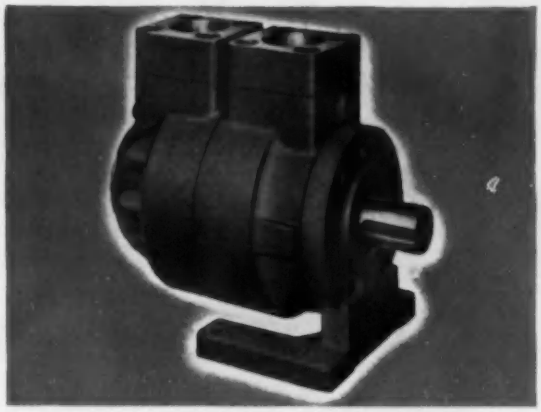
HYDRECO AUXILIARY VALVES 1000/1500 psi

HYDRECO engineers have made very important contributions to the modern hydraulic system in the Relief and Selector Valves now available for your applications. For accurate control over a long service life, HYDRECO Relief Valves in capacities to 100 gpm serve without chatter, squeal or whistle. The Selector Valves enable you to perform additional operations with your system, and these are available in capacities to 50 gpm.



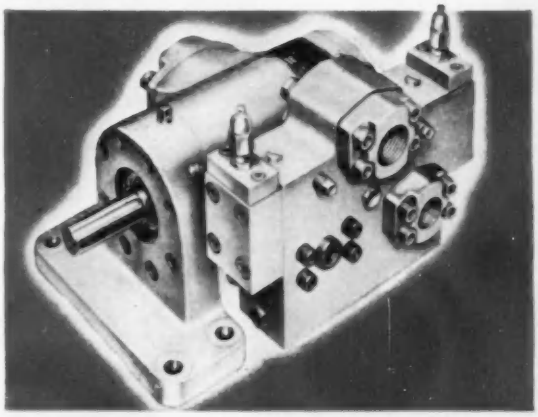
DUDCO DUAL-VANE HYDRAULIC PUMPS 2000 psi

Featuring a simplified 3-unit construction, the new DUDCO PF-100 and PFM-100 Series Pumps, rated at 2000 psi, provide designers with the extra margin of safety which your customers need so badly. The PFM models for heavy duty mobile equipment—the PF models for machine tools, marine, oil field and other industrial applications. The fully balanced DUAL-VANE construction assures high efficiency at higher pressures for continuous operation. Interchangeable Cam Rings add a factor of flexibility that conserves time and money. 3 to 11 gpm at 1200 rpm.



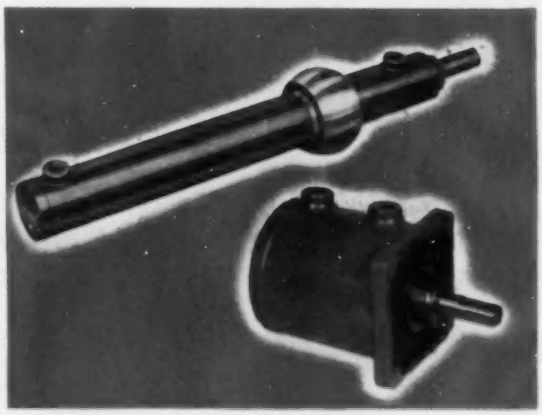
DUDCO DUAL-VANE FLUID MOTORS 2000 psi

DUDCO *Hydraulically Balanced* Fluid Motors utilize the remarkably efficient DUAL-VANE principle to transform fluid power into rotary power with minimized power loss. Operate quietly and smoothly under load with high starting torque. For use in industrial and mobile circuits calling for frequent starting, stopping, and reversing or continuous running at speeds to 3600 rpm. Over 30 standard models for 2000 psi continuous operation . . . actual torque deliveries from 180 to 14,400 lb-in.



DUDCO DOUBLE PUMPS WITH VALVE PANELS 2000 psi

These integral units meet the broad demands of circuits which call for substantial variation in pump volume, such as: "close and hold" or "traverse and feed" cycles. Hydraulic Presses, Plastic Molding Machines and many Machine Tools find these units highly efficient in operation, low in first cost, dollar-saving in reduced piping and valving in the circuit and supremely simple to service. Can be used in the operation of two separate systems or for Hi-Lo circuits.



HYDRECO CUSTOM-BUILT CYLINDERS

HYDRECO Hydraulic Cylinders enjoy an established reputation for quality and dependability. To achieve this degree of dependability entails craftsmanship and manufacturing niceties not practical in so-called standard cylinders built to meet a price. For engineers who seek performance, long-wear under heavy duty conditions and unmatched leakproof qualities, HYDRECO engineering and craftsmanship have something of special interest to offer.

VISIT OUR EXHIBIT

BOOTH 514

PRODUCTION ENGINEERING SHOW

CHICAGO SEPT. 6-16

CLIP AND MAIL THIS COUPON TODAY

THE NEW YORK AIR BRAKE COMPANY

1105 EAST 222nd STREET • CLEVELAND 17 • OHIO

INTERNATIONAL SALES OFFICE, 90 WEST ST., NEW YORK 6, N. Y.

THE NEW YORK AIR BRAKE CO.
1105 East 222nd St., Cleveland, Ohio

Gentlemen:

Kindly send me catalog information on
HYDRECO Pumps ☐ Motors ☐ Valves ☐ Cylinders ☐
DUDCO 2000 psi Pumps ☐ Pumps and Valve Panels ☐
Motors ☐

Name_____

Address_____

City_____ Zone____ State_____

a TURN for the better...

ANCHOR Automatic transfer "around the corner" or "from line to line", makes possible uninterrupted assembly operation, manpower savings and greater efficiency.

Another ANCHOR "First" in automation achievement.

ANCHOR automation can cut cost in any industry.

LEFT: *180° turn automatically transferring between two parallel flat top assembly conveyors.*

LOWER LEFT: *Automatic right angle conveyor between two assembly conveyors.*

BELOW: *Continuous pallet type production or transportation conveyor which can incorporate turns in either direction.*

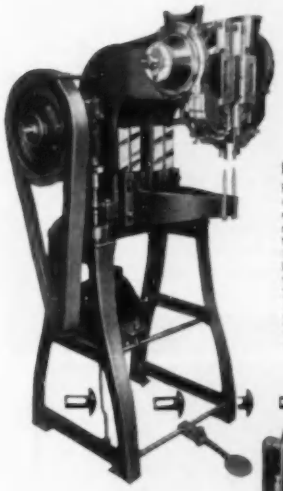
ANCHOR STEEL AND CONVEYOR COMPANY

DESIGNERS AND MANUFACTURERS

6906 KINGSLEY AVENUE • DEARBORN, MICHIGAN

Chicago RIVET WANTS TO "RASSLE" WITH YOUR PRODUCTION "TOUGHIE"

FREE Cost-Production Study
May Crack the Problem Open
... Just Send a Sample of Your
Fastened Assembly or Blueprint



MODEL 214
Feeds, inserts and clinches two rivets at a time. For brass or steel tubular rivets up to 9/64" diameter, 15/16" maximum rivet length. Adjustable centers standard 3/8" to 7"; available 1/2" to 15". Throat depth, 14"; 2 Quick-Change Rotary-Type Hoppers and integral raceway.

MODEL 912
Sets 3/16" steel tubular rivets up to 15/16" long, 12" throat and quick change hopper (rotary type) and raceway.

See Our Working
EXHIBIT
BOOTH 147
Production Engineering Show, Navy Pier Chicago, Sept. 6-16

Chicago Rivet will go to the mat with your problem soon as you send it in. The strength of your fastened assembly, the speed of its production and its cost per unit will be thoroughly analyzed at no cost or obligation to you. The clear, concise report of this study will tell you frankly whether Chicago Automatic Riveting can help you cut costs, speed output, or stengthen your assembly, and to what extent. If it appears that Chicago Riveting can help your picture, actual production rates can often be set up from the data included in your report. Remember, this service costs you not one cent, obligates you in no way whatsoever.

***Chicago* AUTOMATIC RIVETERS ...**
fasten wood to wood, metal to metal, leather to leather, composition to composition, or any combination of these materials with tubular or split rivets. Chicago riveting is faster and more efficient because up to four rivets are fed, inserted and clinched in one automatic operation.

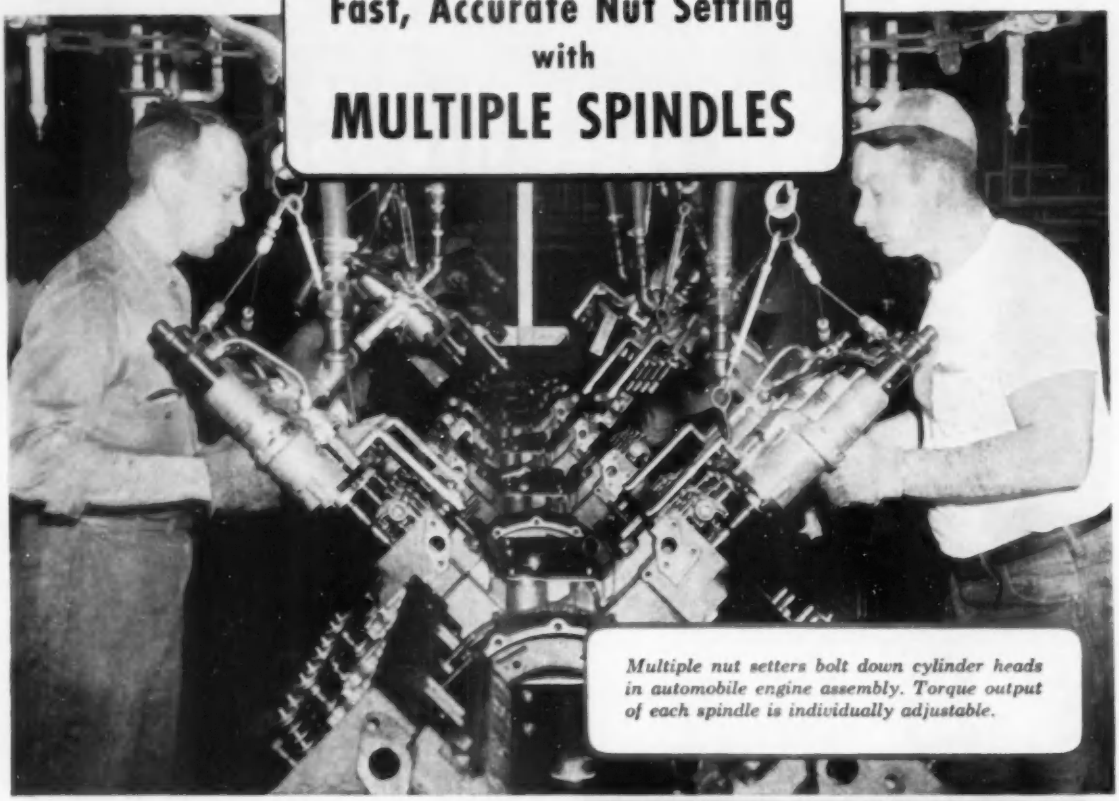
Two modern Chicago Rivet plants at Bellwood, Illinois and Tyrone, Pa. assure prompt delivery anywhere. Your inquiry on tubular or split rivets in any rivet metals will be given prompt attention.

SEND IN YOUR SAMPLE ASSEMBLY OR BLUEPRINT NOW!

Chicago Rivet & MACHINE CO.

9619 West Jackson Blvd., Bellwood (SUBURB OF CHICAGO) Illinois
Branch Factory: TYRONE, PA.

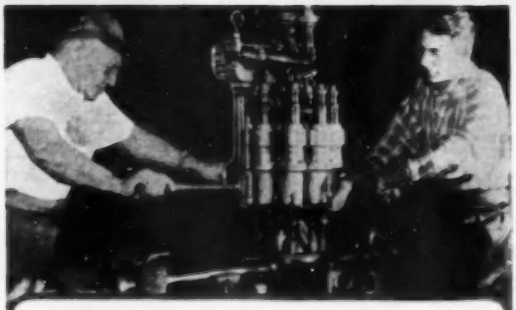
Fast, Accurate Nut Setting with MULTIPLE SPINDLES



Multiple nut setters bolt down cylinder heads in automobile engine assembly. Torque output of each spindle is individually adjustable.

Where bolts or nuts can be run and tightened two or more at a time, Keller Multiple Nut Setters increase output and reduce costs. Even more important, they improve quality control by keeping torque within very close tolerances.

The automotive industry—and many others—are making extensive use of these tools. For detailed information contact your nearest Keller sales office. Descriptive Bulletin 16-101 sent free on request.

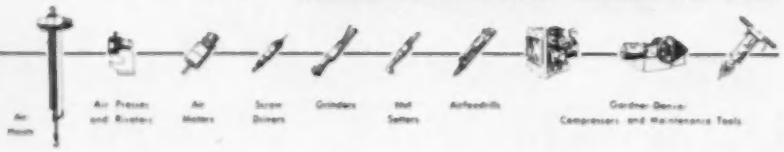


Ten bolts are run simultaneously to attach axle carrier to differential housing. Accurate torque is vital because the joint must be leakproof.

KELLER TOOL

DIVISION OF **GARDNER-DENVER**

GRAND HAVEN, MICHIGAN



A Model MOD (Duplex) Oil-Actuated Multiple Plate Clutch.

B Model MTU (Duplex) Mechanically-Actuated Multiple Plate Clutch (Dry Operating).

C Model MTS (Single) Mechanically-Actuated Multiple Plate Clutch (Oil Operating).

Multiple Plate Twin Disc Clutches provide simple design, quick adjustment, long life

Twin Disc Model MOS (single) and MOD (duplex) Oil-Actuated Multiple Plate Clutches—offer machine tool designers *plus* advantages never before available. They are Twin Disc's answer to the demand for high energy, high inertia, high horsepower clutches especially adaptable to applications creating high temperatures and operating under heavy, abusive loads.

Models MOS and MOD clutches give *new* performance on the job *because:*

- New, integral oil cylinder clamps plate stack, compensates automatically for friction plate wear.
- Mechanical controls to take up or adjust for wear are eliminated. Wear life is longer!
- A *floating* pressure plate is the ram of the cylinder. As plate stacks wear, ram travel increases automatically.
- Torque capacity of clutch is always constant for a given oil pressure. There's no loss of torque through plate wear or varying adjustment.
- Constant torque capacity often permits more compact installation of a *smaller* clutch . . . saves space and cost.
- They're adaptable to remote control without complicated actuating linkage.
- They offer *continuous* service with minimum maintenance.

Twin Disc Model MTS (single) and MTU (duplex) Mechanically-Actuated Multiple Plate Clutches—are the standard of the industry for machine tool users who prefer mechanical actuation. These long-established, proven-performance clutches *feature:*

- High clamping efficiency — with comparatively low pressure on clutch lever.
- High torque capacity—with longer wear life. Single-point adjustment to reduce maintenance time.
- Compact design — to operate in minimum of space. (Shorter clutch lengths).
- Stability—unaffected by centrifugal action. Permit high rotation speeds.
- Close tolerances—all parts accurately machined.
- Heat-treating of operating parts—for maximum strength and longest operating life.

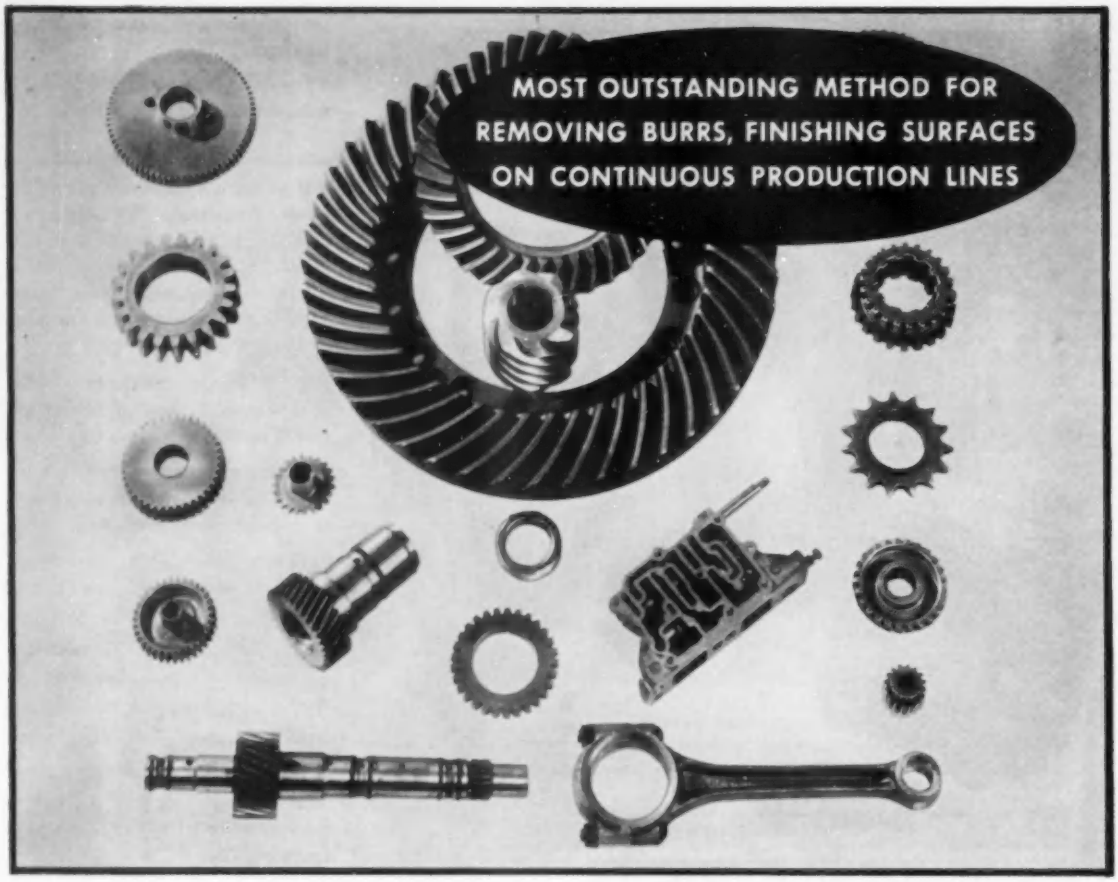
Twin Disc Mechanically-Actuated Multiple Plate Clutches, Models MTS and MTU, are available for either dry or oil operation, in capacities from .47 to 44 hp per 100 rpm. Write today for Bulletin 134-B, and complete information to help you select the *proper* type and size Twin Disc Multiple Plate Clutch for your application. Twin Disc Clutch Company, Racine, Wisconsin, Hydraulic Division, Rockford, Illinois.

Visit Booth No. 103
Production Engineering Show
Navy Pier, Chicago
Sept. 6 to 16

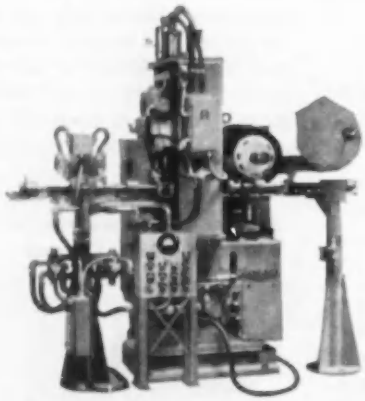
TWIN DISC

TWIN DISC

Friction Clutches and Fluid Drives



BRUSHAMATION BY OSBORN



AUTOMATED BRUSHAMATIC®... One of Osborn's integrated production line automatic power brushing machines.

The parts shown above are typical of the work you can now handle with Osborn's line-production power brushing method... ***BRUSHAMATION.***

COMPLETELY INTEGRATED...Osborn's Automated Brushamatic® Equipment fits right into your production line.

ELIMINATES BOTTLENECKS. It is now possible to remove burrs, blend surface junctures, remove weld scale, clean parts on a continuous line-production basis.

AUTOMATES FINISHING OPERATIONS... takes parts right from your production lines, feeds them to rotating power brushes, delivers them precision-finished to micro-tolerances where necessary

... all without manual handling.

Qualified engineers will show how you can benefit with automated brushing at the Osborn Booth 856, Production Engineering Show, Chicago, Sept. 6-17 and at Booth 718, The Metal Show, Philadelphia, Oct. 17-21. *The Osborn Manufacturing Company, Dept. E-33, 5401 Hamilton Avenue, Cleveland 14, Ohio.*

Osborn Brushes

© 1955 The Osborn Manufacturing Company

OSBORN

BRUSHING METHODS • POWER, PAINT AND MAINTENANCE BRUSHES
BRUSHING MACHINES • FOUNDRY MOLDING MACHINES

AI

AUTOMOTIVE INDUSTRIES

MACHINE TOOL & PRODUCTION EQUIPMENT ISSUE—1955

COLISEUM MACHINERY SHOW

CHICAGO, ILL.

SEPT. 6-17, 1955

CHICAGO COLISEUM

Announcing
the NEW
KEMPSMITH
MASTER-MILL
KEMPSMITH
MASTER-MILL

WHAT'S NEW ... AT COLISEUM MACHINERY SHOW

THE BAIRD MACHINE CO.

Booth 619

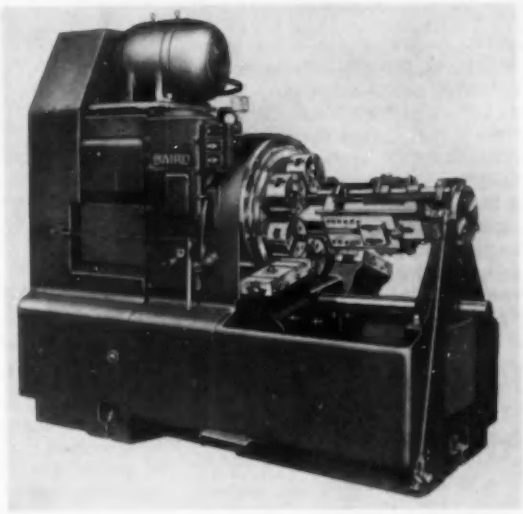
A Baird Model 76H chucking machine (7 in.-six-spindle horizontal indexing lathe), with motor drive arrangement, will be set up for single indexing. The machine will be equipped with longitudinal and cross slide tool slides, high-speed transmission and expanding type mechanical chucks.

A No. 2 automatic four slide wire forming machine, equipped with one hp Varidrive motor, heavy horizontal press attachment and split cams will be displayed. The machine will be tooled for production of a key retainer at a rate of 150 pieces per minute.

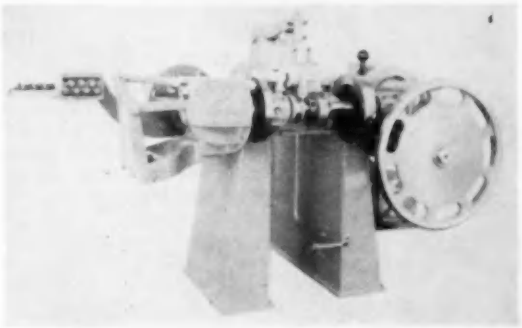
A No. 3 = 25 automatic multiple transfer press will be equipped with variable speed motor drive, back roll feed, automatic stop for material run-out, automatic lubrication system, automatic motorized payoff and rewind reels, and a five hp brake motor. The machine will have an 11-station die set, tooled to produce a medallion at a rate of 200 pieces per minute.

An automatic 5 in. four spindle vertical continuous lathe with motor drive equipped with a five hp spindle motor, one hp turret motor, and set of feed and speed gears will be shown but will not be tooled for production.

Circle 201 on postcard for more data



Baird 76H six spindle chucking machine



Baird No. 2 four slide automatic wire forming machine.

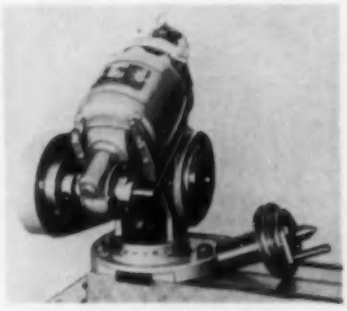
K. O. LEE CO.

Booth 554

A new, motor driven workhead, Model B943, will be introduced and demonstrated. It is a compact, self-contained power unit for internal and external grinding, held in position by two T-slot bolts and can be mounted at any convenient spot on the table. The swivel base, which is graduated 90 deg one side of center and 45 deg on the other, permits the workhead to swivel full 360 deg if desired. Swivel base can be easily removed from head, permitting units to be mounted on table without base if desired.

The No. 11 B & S tapered spindle, mounted on ball bearings, is hardened and ground and designed to receive chucks, collet fixtures, face plates, straight or tapered sleeves, centers and like equipment; also available with No. 12 B & S and No. 5 Morse. Streamlined in design, this fixture is quickly mounted and easy to keep clean.

Circle 202 on postcard for more data



Model B943 motor-driven work head.

COLISEUM MACHINERY SHOW

GRAHAM MACHINE TOOL CO.

Booth 921

The new improved Pearson Model H turret type vertical milling machine has back geared head with geared automatic power feed for the spindle in both directions, automatic spindle travel in an all-angle head with automatic trip-out in both directions, and spindle speeds from 110-2720 or 264-4100 rpm with a 1.2 hp motor.

This machine has a heavy frame, knee, turret and ram. It can be used for high precision jig boring to 0.0001 in., tool and die work, and production work.

The dovetail overarm eliminates realigning the spindle after movement of the head.

Extra large dials provide quick and accurate table settings. All lead screws are provided with means for backlash removal.

A geared power feed unit for the table and micrometer measuring equipment are among the many optional accessories.

The Graham dial type high speed Universal milling machines feature power rapid traverse, forward and reverse in all directions.

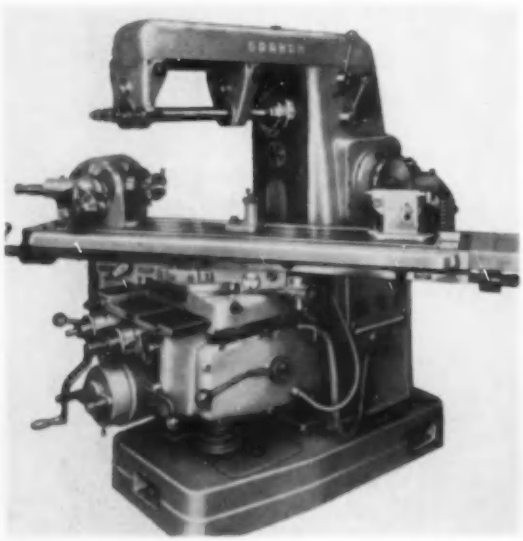
Tables have wide range of automatic feed rates in all directions up to 26 ipm; rapid traverse is 71 ipm.

Visual oil control is supplied for all moving parts including lead screws, arbor, etc. Hardened and ground gears assure easy control and durability.

All controls are located in front of the machine for easy operation.

Machines are supplied with universal dividing head, heavy duty vertical milling attachment, arbor, coolant system as standard equipment. A wide range of accessories is available. Machines built in sizes 2, 3 and 4.

Circle 203 on postcard for more data



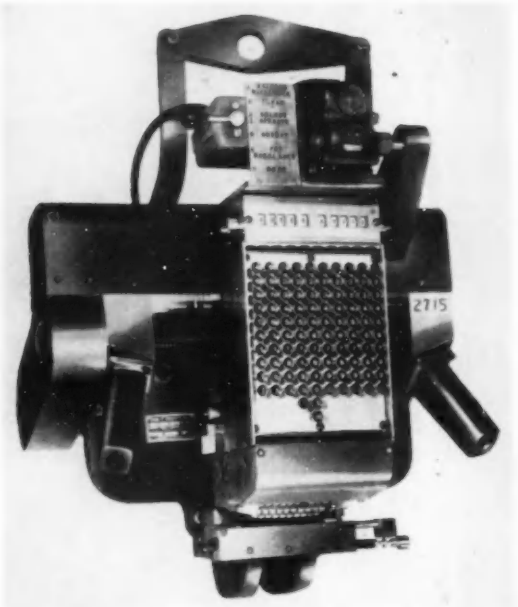
Graham dial type universal miller

GEO. T. SCHMIDT, INC.

Booth 641

The Car Frame Numberer for serially numbering car and truck frames. It is said to produce clean, deep, uniform numbering without fail, in a rolling operation, employing a barrel-shaped numbering head of selective style.

Operation consists of swinging tool into position with frame between anvil and number wheels. Pressure on the pistol grip switches moves the head across the frame from left to right, marking as it moves. Range of machine permits marking of stock from 0.050 to 0.312 in. thick.



G. T. Schmidt car frame numbering machine

Other products shown will be hydraulic power marking machines and model 335 "Pneudraulic" production marking, machine, recommended by the manufacturer where freedom of operator's both hands is advantageous.

Circle 204 on postcard for more data

AMERICAN PULLMAX CO.

Booth 120

Sheet and plate fabricating machines will be shown. Straight cutting, circular cutting, design cutting, inside cutting, beading, joggling, slot cutting, louvering, dishing or edge bending of mild steel from the thinnest gages up to 11/32 in. plate will be demonstrated.

Circle 205 on postcard for more data

COLISEUM MACHINERY SHOW

DoALL new band machine with power feed table and other hydraulic adjustments

DoALL CO.

Booth 528

DoALL will demonstrate its automatic power saw, designed for the Demon high-speed steel saw band. The machine will cut a wide variety of tough metals at high rates. In addition, a unique hydraulic nesting fixture will be used on the power saw to cut stacks of small diameter rounds. This new fixture, synchronized with the sawing cycle, automatically clamps and unclamps the rounds as required during the automatic indexing.

The Model 26-3 Contour sawing machine, demonstrating rapidity and versatility of the band machine method on duplicate part production, will also be shown. Notching, shaping, slotting, parting, three dimension cutting and stack cutting will be performed on the same machine. Stainless steel will be cut at rapid rates in a friction sawing demonstration on a high-speed DoALL Zephyr.

Versatility of the surface grinder will be shown in a variety of demonstrations. Form grinding demonstrations will be conducted on new completely automatic grinders which incorporate automatic downfeed, crossfeed and crossfeed reverse. Form dressing or shaping of grinding wheels and the subsequent reproduction of this form directly in the work will also be demonstrated.

A corollary grinding demonstration at the company's Des Plaines plant will deal with slicing and dicing of germanium — the crystalline metal used in transistors. The highly brittle nature of this material makes it particularly subject to fracturing and breaking with the slightest vibration or bounce. Extreme stability and rigidity of DoALL grinder construction will be shown by smooth, efficient and productive performance on this material.

Circle 206 on postcard for more data

PORTAGE MACHINE CO.

Booth 521

A horizontal boring, drilling, milling and duplicating machine will be displayed and demonstrated for the first time. All these various operations can be done in one setup, by one operator and with no change-over time lost. The combined Portage mill and Turchan hydraulic follower can accurately bore a series of holes, mill pockets and also outside bosses.

Machine has 36 spindle speeds, 8 to 1000 rpm spindle speed range and 18 milling feeds to table, saddle and head. Base construction of the mill is unusually wide and deep, box section cast entirely in one piece. Outer base walls directly under the column are continuous without cored openings and further reinforced by vertical ribbing, offering unusual rigidity and additional safety factors.

In addition to the mill, the latest P.D.Q. (Portage Double Quick) tools will be demonstrated.

Circle 207 on postcard for more data

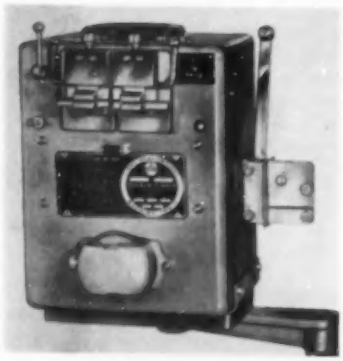
DoAll automatic power saws with Demon high speed steel blades cutting extremely tough alloys.

COLISEUM MACHINERY SHOW

WALKER-TURNER DIV. KEARNEY & TRECKER CORP.

Booth 710

A new air feed, said to fit the head of any W-T type of drill press up to 6 in. spindle travel, will be shown. The manufacturer claims that it can be installed in about 10 minutes without need for machining or making electrical connections, and that it will not interfere with the normal function, swing or position of the machine. It is pointed out that the air feed contains no hydraulic components, that its pneumatic micro-valve imparts to the spindle the desired sensitive, automatic feed-and-retard action for a variety of continuous production operations for woodworking as well as for metalworking. In special cases, a hydraulic check valve is available as an accessory.

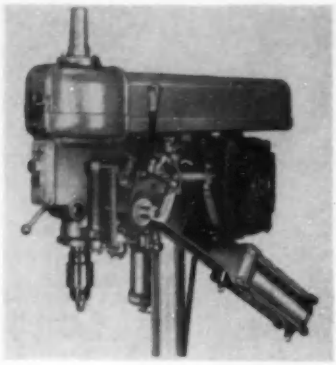


W-T band saw welder

By means of a check valve and a series of set screw adjustments, the rate of feed may be controlled to fit the job at hand, including checking and slowing-down the spindle at several points as well as at the drill's break-through point. Release of a valve-stop reverts the air feed to single cycle operation, and the removal of two plugs from the air cylinder head converts it for conventional hand operation. The manufacturer claims the accuracy of feed will hold indefinitely within 0.003 in.

Feed pressure at the drill point averages 14x greater than the air pressure. For example, a ⅛ in. drill may be operated at 5 to 7 psi to deliver between 70 lb and 100 lb at drill point. Air pressure may be regulated to suit production requirements.

The average time it takes to butt-weld a band saw blade is less than two minutes with the new ¾ in. capacity light-heavyweight band saw welder also displayed at the Walker-Turner booth. It features quick, easy operating, adjustable heavy duty blade clamps with cam locks and a built-in flash grinder. It is claimed the transformer and relay components are of exceptional quality to assure a lifetime of trouble-free operation. The 115-volt model includes a cut-off shear, and a 230-volt model is also available.



W-T Air Feed

Although primarily designed for portability, provision is made for attaching the welder to any metal-cutting or wood-cutting band saw.

Circle 208 on postcard for more data

SHELDON MACHINE CO.

Booth 702

The new 15 in. Sebastian geared head lathe has all controls centrally grouped within convenient reach of the operator. Features include a wide, heavy bed, anti-friction bearing headstock with zero precision tapered roller bearings supporting the spindle, cam action tailstock clamp and easy-shifting spindle speed dial.

The spindle is thick walled with multiple splines for extra strength and rigidity. The long tapered key drive nose is standard.

All gears in the headstock run in oil. The gear box has 60 different pitches and feeds. The leadscrew reverse lever is built into the gear box and permits the operator to change the direction of the leadscrew while the lathe is running.

A cam action tailstock clamp permits rapid release and instant locking of the tailstock. The carriage is massive and has a large bearing surface. A built-in, one-shot oiling system provides lubrication for all bearing surfaces. Two friction disk type clutches in the apron provide power longitudinal and power cross feeds. These clutches can be engaged individually or simultaneously.

Circle 209 on postcard for more data

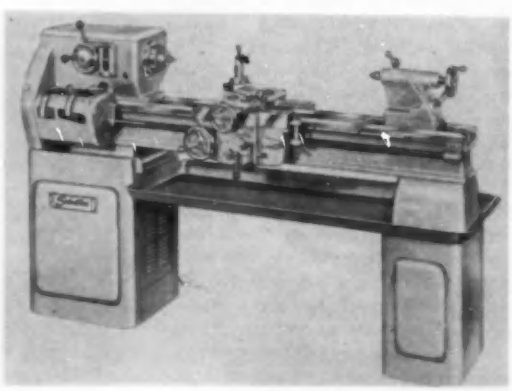
EAST CHICAGO MACHINE TOOL CORP.

Booth 650

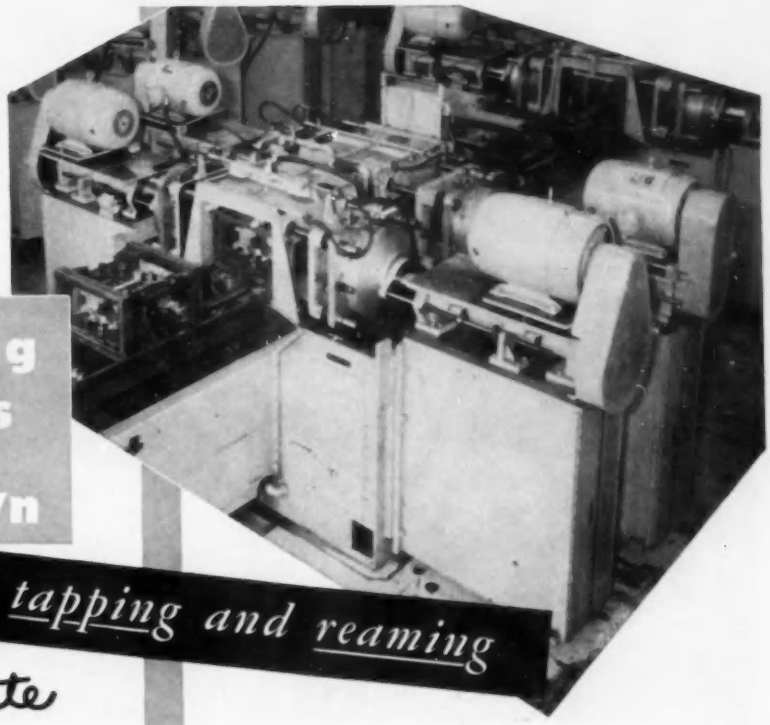
A new, lightweight, portable, hydraulic scrap metal baler, designed especially for the volume fabricator of light gage ferrous and non-ferrous materials, will be shown in operation. It compresses the contents of the 8 cu ft charging compartment into 12 cu in. briquettes, weighing up to 120 lb, depending upon the material being baled. Scrap and trimmings up to 54 in. long can be handled. The baler occupies little floor space, and no pit is required. Charging compartment door, bale ejector and compressing ram are hydraulically operated.

The other unit to be introduced will be the Cyclomatic Balemaster baling

(*Turn to page 282, please*)



Sebastian 15 in. geared head precision lathe.

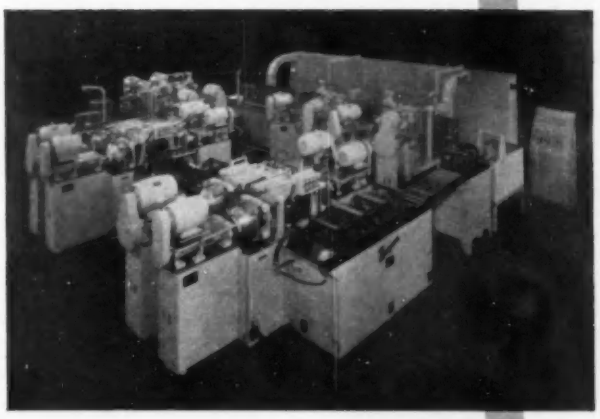


• Zagar pallet-type transfer machine uses Zagar Feed Units at eight double machining stations, performing 16 operations with 224 spindles to ream, drill and tap cast alloy typewriter frames.

NOW, bring your costs away down

on drilling, tapping and reaming

Investigate Zagar FEED UNITS now!



Flexibility at the highest! Zagar Feed Units can be adapted to any number of profitable applications. They're fast, accurate, time-saving, space-saving. You'll save handsomely on tooling costs; you can re-tool in a matter of minutes. On every job, Zagar Feed Units give you the benefits of:

- Single-slide design
- Long stroke
- Maximum h. p. — 7½
- Standard basic tank
- Stock delivery

Zagar Feed Units are designed to conform to J. I. C. standards. We can provide complete tooling plans for drilling, tapping, and reaming on close centers *from any angle*. Phone the nearest Zagar representative or Cleveland.

Write for new technical data sheets "U-9."

We'll look for you at Booth 461, Coliseum Machinery Show, Chicago

Zagar

TOOLS FOR INDUSTRY and SPECIAL MACHINERY

Lincoln for 1956 Has 285 Hp Engine

The new Lincoln Premiere hard top convertible

Lincoln is first with a variety of safety features to protect both drivers and passengers. It has a retracted steering column with a new type steering wheel that provides a 3½ in. energy absorbing cushion between its outer rim and the retracted top of the steering column. Lincoln has provided safety seat belts and new double grip rotor type door locks which withstand three times normal impact in collisions before opening.

NEW styling and new performance herald the announcement of the 1956 Lincoln line. The cars will be available in two series and five body styles. Top series in the line will be the Premiere with the established Capri as the standard model.

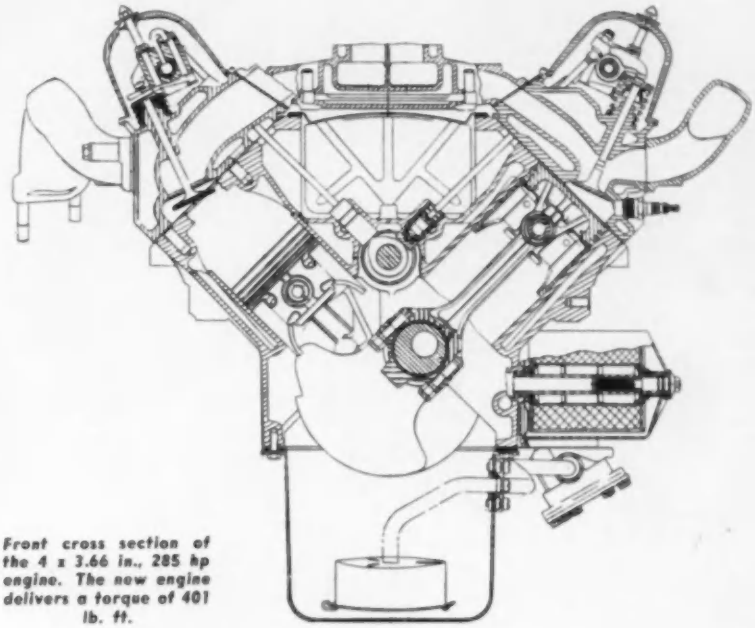
Featuring a long low graceful silhouette which has forward thrusting front fenders and canted taillights, the cars are 222.8 in. long, 60.2 in. high and 79.9 in. wide. These all-new cars have a wheelbase of 126 in. and are powered by a high compression, OHV V-8 engine of 285 hp.

In addition to advanced body styling and many technological changes, Lincoln features for the first time much in the way of safety improvements. The steering column has been retracted and is fitted with a new type

1956 LINCOLN

Basic Specifications

	1956 Lincoln 4 Dr. Sedan
Engine	
Displacement (cu in.)	368
Cylinder Bore (in.)	4.00
Stroke (in.)	3.66
Compression Ratio	9.0 to 1
Horsepower	285
Torque (lb ft)	401
Body Dimensions (Inches)	
Wheelbase	126
Over-all Length	222.9
Over-all Width	79.9
Over-all Height	60.2
Tread—Front	58.5
Tread—Rear	60.0
Tires—Size	8.00x15
Front Overhang	34.9
Rear Overhang	61.9
Deck Length	44.8
Cowl Length	55.2
Minimum Road Clearance	6.8
Headlights—Ct	63.6
Taillights—Ct	65.3
Interior Dimensions (in.)	
Leg Room—Front	44.8
Leg Room—Rear	43.9
Shoulder Room—Front	59.4
Shoulder Room—Rear	58.4
Hip Room—Front	61.8
Hip Room—Rear	63.8
Head Room—Front	35.4
Head Room—Rear	34.3
General	
Weight (lb)	4211
Glass Area (sq in.)	3967
Solid Colors	10
Two-Tone Combinations	24



Front cross section of the 4 x 3.66 in., 285 hp engine. The new engine delivers a torque of 401 lb. ft.

steering wheel which provides a 3½ in. energy-absorbing cushion between the outer rim of the wheel and the retracted top of the steering column. New double grip rotor type door locks are standard equipment. These locks are said to withstand three times normal impact in collisions before opening. With the new models, safety belts are available. To prevent glare, the instrument panel top has been covered with a vinyl plastic material. The rear view mirror has now been made shatterproof for greater safety.

Engineering advancements for 1956 include, in addition to the new engine, In-Line power steering, new shock absorber valving, an improved automatic transmission, a new carburetor air intake, a new propeller shaft location, and a 12-volt electrical system.

The engine has a displacement of 368 cu in.—4 x 3.66 in. bore and stroke—and a compression ratio of 9 to 1. It has a maximum torque output of 401 lb ft.

1956 four-door Lincoln Capri features entirely new styling. In addition to the completely new body, it has a new and more powerful V-8 engine and a host of safety equipment.

This under-the-hood view shows the engine installation, heater, fan, power brake assembly and the location of miscellaneous other components.

Among its new components are the block, crankshaft, camshaft, oil pump, and ventilating system.

Better breathing has been obtained by providing a new rocker arm ratio of 1.6 to 1 which gives an effective valve lift on both intake and exhaust valves of 0.417 in. Exhaust valve head diameter has been increased to 1.635 in. The new intake manifold has a 24 per cent larger capacity, and the exhaust manifold capacity has been increased 10 to 15 per cent. A dual exhaust system is used with the engine.

The camshaft has been redesigned with a reduced shaft diameter. By reducing the shaft diameter, more area at the sides of the lobes is exposed, and this greater area lends itself to closer metallurgical control. The camshaft gear, which requires a special heat treatment, has an additional boss to lower its rate of cooling as compared with the lobes. Due to the new metallurgical processes, the entire camshaft is said to have greater durability and improved cam-tappet compatibility.

Design of the crankshaft has been improved. Two center counterweights have been eliminated, resulting in a substantial weight reduction.

A thermostatic control on the fresh air intake to the carburetor operates in a range of 68 to 72 F. This new temperature-controlled air induction system provides heated fresh air to the carburetor automatically. It provides the proper temperature for most efficient operation. A special duct is attached to the exhaust manifold to permit the carburetor air to flow over the exhaust manifold before it reaches the carburetor during warm-up. The duct has a thermostatically controlled valve which gradually opens so that the air becomes cooler as the need for warmed air decreases. When the valve is opened, the air is diverted from the exhaust manifold and taken directly from the front grille of the car.

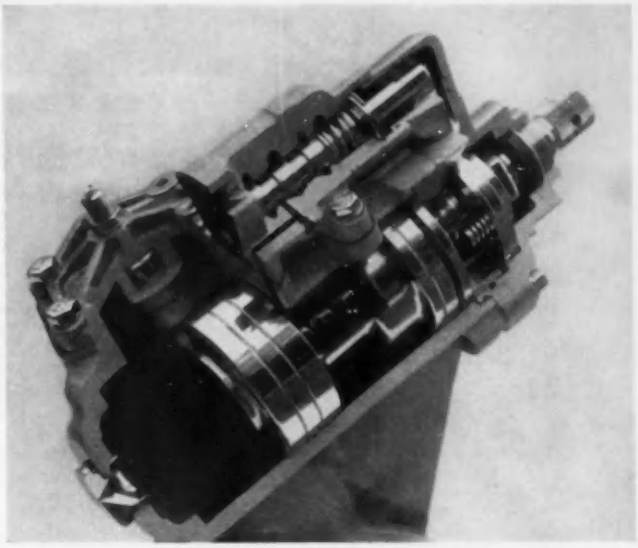
The carburetor features a new integral automatic choke which utilizes the filtered, exhaust-heated air. The thermostatic choke control is mounted directly on the carburetor body. Specific fuel economy is improved by a new metering system which allows finer calibration limits.

A new distributor spark control system has been designed to prevent spark detonation during acceleration from part-throttle to full-throttle. Formerly, the spark advance was controlled by a single diaphragm which was actuated by the amount of venturi vacuum created by air-flow through the carburetor venturis. The addition of a second diaphragm, operated by intake manifold vacuum, has been provided to act as a counter-force and provide a momentary yet instantaneous spark retarding action for the time it takes for the venturi vacuum and the intake manifold vacuum to equalize.

Intake manifold vacuum drops the moment the

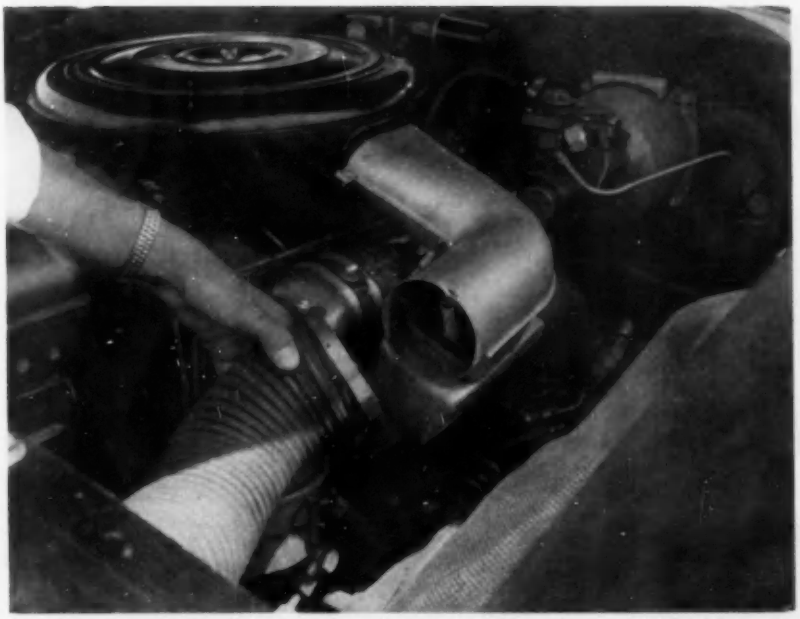
throttle plates are opened wide, while the venturi vacuum which is affected by the flow of air through the carburetor is not immediately changed until the air flow has increased.

The newly-released rotor-type oil pump, which replaces the gear-type, is said to provide more positive lubrication and quieter operation under all conditions. Since the rotary pump displaces a positive quantity of oil with each revolution, the oil pressure remains more constant even though the engine is operating at idle speed. The clearances maintained in the new pump are not as critical as in the former gear-type pump and, therefore, when wear does occur after extended operation, the oil pressure and flow are not appreciably affected. The oil pump intermediate driveshaft has been case-hardened to minimize wear at the distributor and oil pump drive unions.



Lincoln's new "In-Line" power steering unit. It assures complete power steering of the vehicle at all times.

A completely new ventilation system with newly-located breather, baffle, and a combination oil-filler and road-draft tube, provides more positive crankcase ventilation. The breather is located on the valley cover at the front between the cylinder heads. Fresh air is taken in at this point and circulated through the engine. A baffle in the oil pan directs the fume-laden air forward to the top of the front cover where it is expelled through the road-draft tube. This combination road-draft and oil-filler tube employs a special oil trap to prevent any possibility of oil spillover at high speeds.



New this year is a completely enclosed air silencer and air cleaner which will take air from a front grille opening. Air will be taken through the duct work shown and delivered to the cleaner which will assure an abundant supply of fresh air at all times for carburetion.

A 12-volt electrical system has been adopted to provide the additional voltage required for higher-compression engines. The additional voltage also increases the speed and power of the starter.

Spark plugs have a new electrode material that is claimed to offer 100 per cent higher resistance to erosion to further increase the high performance life of the new 18 mm plug.

Lincoln's improved automatic transmission is standard equipment on all models. Work has been done primarily on the hydraulic control system and in tailoring the entire unit to the

(*Page 266, please*)

1955 Machine Tool Show Exhibitors

This Alphabetical Compilation Is the Latest Listing as We Go to Press
Figures in Parentheses Are Company Booth Numbers at the Show

Abrasive Machine Tool Co.,
E. Providence 14, R. I. (317)

The Ajax Mfg. Co.,
Cleveland 17, Ohio (1309)

American Gage & Machine Co.,
Chicago 44, Ill. (417)

American Tool Works Co.,
Cincinnati 2, Ohio (420)

F. E. Anderson Oil Co., Inc.,
Portland, Conn. (225)

Armstrong-Blum Mfg. Co.,
Chicago 39, Ill. (416)

Arter Grinding Machine Co.,
Worcester 5, Mass. (1308)

Automotive Industries,
Philadelphia 39, Pa. (204)

Avey Drilling Machine Co.,
Cincinnati 1, Ohio (316)

Axelson Mfg. Co.,
Div. U. S. Industries, Inc.,
Los Angeles 58, Calif. (519)

Baker Bros., Inc.,
Toledo 10, Ohio (1421)

Baldwin-Lima-Hamilton Corp.,
Hamilton, Ohio (203)

Barber-Colman Co.,
Rockford, Ill. (1322)

Barber-Colman Co.,
Hendey Div.,
Rockford, Ill. (221)

Bardons & Oliver,
Cleveland 13, Ohio (325)

Barnes Drill Co.,
Rockford, Ill. (818)

W. F. & John Barnes Co.,
Rockford, Ill. (1223)

Baush Machine Tool Co.,
Springfield 7, Mass. (515)

Beatty Machine & Mfg. Co.,
Hammond, Ind. (614)

Besly-Welles Corp.,
Beloit, Wis. (911)

The Blanchard Machine Co.,
Cambridge 39, Mass. (406)

E. W. Bliss Co.,
Canton, Ohio (1414)

The Bodine Corp.,
Bridgeport 5, Conn. (209)

The Boye & Emmes Machine Tool Co.,
Hartwell, Cincinnati 16, Ohio (316)

Brown & Sharpe Mfg. Co.,
Providence 1, R. I. (520)

Bryant Chucking Grinder Co.,
Springfield, Vt. (1015)

Buffalo Forge Co.,
Buffalo 5, N. Y. (510)

Buhr Machine Tool Co.,
Ann Arbor, Mich. (1315)

The Bullard Co.,
Bridgeport 2, Conn. (1213)

Carboloy Div., Gen. Electric Co.,
Detroit 32, Mich. (109)

The Carlton Machine Tool Co.,
Cincinnati 25, Ohio (919)

Cincinnati Bickford Tool Co.,
Oakley, Cincinnati 9, Ohio (901)

The Cincinnati Gilbert Machine Tool Co.,
Cincinnati 23, Ohio (816)

Cincinnati Lathe & Tool Co.,
Oakley, Cincinnati 9, Ohio (309)

The Cincinnati Milling Machine Co.,
Oakley, Cincinnati 9, Ohio (1205)

The Cincinnati Milling Machine Co.,
Oakley, Cincinnati 9, Ohio (306)

The Cincinnati Shaper Co.,
Cincinnati 25, Ohio (1105)

Clearing Machine Corp.,
Chicago 38, Ill. (716)

Cleereman Machine Tool Co.,
Chicago 6, Ill. (1007)

The Cleveland Automatic Machine Co.,
Norwood, Cincinnati 12, Ohio (412)

Cleveland Crane & Engrg. Co.,
Wickliffe, Ohio (1418)

The Cleveland Grinding Machine Co.,
Cleveland 12, Ohio (810)

Cleveland Tapping Machine Co.,
Canton 6, Ohio (409)

Colonial Broach Co.,
Detroit 13, Mich. (1112)

Cone Automatic Machine Co., Inc.,
Windsor, Vt. (401)

Consolidated Machine Tool Co.,
Rochester 10, N. Y. (217)

Covel Mfg. Co.,
Benton Harbor, Mich. (720)

The Cross Co.,
Detroit 7, Mich. (1118)

Danly Machine Specialties, Inc.,
Chicago 50, Ill. (1302)

Davis & Thompson Co.,
Milwaukee 16, Wis. (602)

The Denison Engineering Co.,
Columbus 16, Ohio (819)

DeVlieg Machine Co.,
Ferndale, Detroit 20, Mich. (1317)

The Eastern Machine Screw Corp.,
New Haven 6, Conn.

Economy Engineering Co.,
Willoughby, Ohio (704)

Edlund Machinery Co. Div.,
Bradley-Edlund Corp.,
Cortland, N. Y. (115)

Elmes & King Divisions,
American Steel Foundries,
Cincinnati 29, Ohio (1121)

Ex-Cell-O Corp.,
Detroit 32, Mich. (1319)

Famco Machine Co.,
Kenosha, Wis. (507)

Federal Press Co.,
Elkhart, Ind. (801)

Fellows Gear Shaper Co.,
Springfield, Vt. (1416)

Ferracute Machine Co.,
Bridgeton, N. J. (702)

Fitchburg Engineering Corp.,
Fitchburg, Mass. (208)

The Foote-Burt Co.,
Cleveland 8, Ohio (1409)

Fosdick Machine Tool Co.,
Cincinnati 23, Ohio (1402)

Fox Engineering Co.,
Jackson, Mich. (419)

Frauenthal Div. The Kaydon Engrg. Corp.,
Muskegon, Mich. (806)

Gallmeyer & Livingston,
Grand Rapids 2, Mich. (906)

Gardner Machine Co.,
Beloit, Wis. (1115)

The Gear Grinding Machine Co.,
Detroit 11, Mich. (315)

Gemco Shaper Co.,
St. Louis 16, Mo. (706)

Geometric Tool Co., Div.,
Greenfield Tap & Die Corp.,
New Haven 15, Conn. (223)

Giddings & Lewis Machine Tool Co.,
Fond du Lac, Wis. (710)

Gisholt Machine Co.,
Madison 10, Wis. (1413)

Gleason Works,
Rochester 3, N. Y.

Geo. Gorton Machine Co.,
Racine, Wis. (1019)

The Goss & DeLeeuw Machine Co.,
Kensington, Conn. (1113)

Gould & Eberhardt, Inc.,
Irvington 11, N. J. (1424)

The G. A. Gray Co.,
Cincinnati 7, Ohio (1120)

Greaves Machine Tool Div.,
J. A. Fay & Egan Co.,
Cincinnati 2, Ohio (721)

Greenlee Bros. & Co.,
Rockford, Ill. (1221)

The Hall Planetary Co.,
Philadelphia 29, Pa.

The Hamilton Tool Co.,
Hamilton, Ohio (212)

Hanson-Whitney Co.,
Division of the Whitney Chain Co.,
Hartford 2, Conn. (807)

Hartford Special Machinery Co.,
Hartford 12, Conn. (201)

The Heald Machine Co.,
Worcester 6, Mass. (902)

Hendy Machine Co.,
Torrington, Conn.

E. F. Houghton & Co.,
Philadelphia 33, Pa. (318)

The Hydraulic Press Mfg. Co.,
Mount Gilead, Ohio (718)

Illinois Tool Works,
Chicago 39, Ill. (1323)

Iron Age,
New York 17, N. Y. (119)

Johnson Machine & Press Corp.,
Elkhart, Ind. (411)

Jones & Lamson Machine Co.,
Springfield, Vt. (1111)

Kaukauna Machine Corp.,
Kaukauna, Wis. (1210)

Kearney & Trecker Corp.,
Milwaukee 14, Wis. (508)

The Kempsmith Machine Co.,
Milwaukee 14, Wis. (616)

Kennametal, Inc.,
Latrobe, Pa. (123)

Kent-Owens Machine Co.,
Toledo 10, Ohio (1218)

Kingsbury Machine Tool Corp.,
Keene, N. H. (915)

W. H. Knight Machinery Co.,
St. Louis 8, Mo. (418)

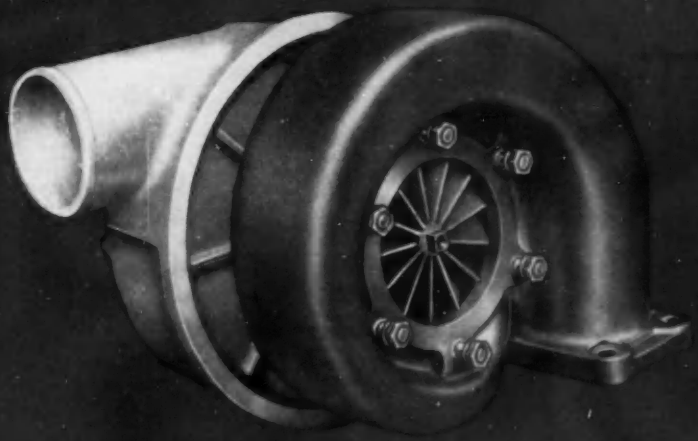
L & J Press Corp.,
Elkhart, Ind. (407)

Lake Erie Engineering Corp.,
Buffalo 17, N. Y. (1310)

(Turn to page 250, please)

SCHWITZER

TURBOCHARGERS



OVER ONE HUNDRED MILLION MILES OF COMMERCIAL OPERATION

After 30 Years of Extensive Research and Production Experience in the Supercharging Field, Schwitzer Now Offers a Complete Line of 4 Sizes of Turbochargers For 50 to 1200 HP Installations. Now in Production in All Heavy Duty Fields—Truck-Tractor-Stationary-Marine.

SCHWITZER
CUMMINS COMPANY
INDIANAPOLIS, INDIANA

EXHIBITORS AT

The 1955 Production Engineering Show

This Alphabetical Listing Is the Latest Available as We Go to Press
Figures in Parentheses Are Company Booth Numbers

Adams Carbide Corp.,
Kenilworth, N. J. (445)

Airborne Instruments Laboratories, Inc.,
Kincola, N. Y. (531)

Aircraft Marine Products, Inc.,
Harrisburg, Pa. (447)

Alar Design, Inc.,
Cincinnati 38, Ohio (575)

Alemite Div.,
Stewart-Warner Corp.,
Chicago 18, Ill. (416)

Allen-Bradley Co.,
Milwaukee 4, Wis. (244)

Louis Allis
Milwaukee, Wis. (119, 120)

Aloris Tool Co.,
Flushing 55, N. Y. (345)

American Actuator Corp.,
New York 17, N. Y. (465)

American Sip Corp.,
New York, N. Y. (101)

Ampco Metal, Inc.,
Milwaukee 46, Wis. (516)

Apex Tool & Cutter Co.,
Shelton, Conn. (855)

Automation Products Div.,
Bill-Dee Corp.,
McHenry, Ill. (475)

Balance Engineering Co.,
Cincinnati 9, Ohio (436)

Balerank, Inc.,
(Oakley), Cincinnati 9, Ohio (437)

Barrett-Cravens Co.,
Northbrook, Ill. (452)

The Barry Controls Corp.,
Watertown 72, Mass. (153)

G. S. Blakslee & Co.,
Chicago 50, Ill. (44)

Boice Manufacturing Co.,
Staatsburg, N. Y. (826)

Boston Gear Works,
Malden 48, Mass. (110)

The Bristol Co.,
Waterbury 20, Conn. (640)

Brooks Equipment & Mfg. Co.,
Knoxville, Tenn. (528)

Buck Mfg. Co.,
Los Gatos, Calif. (141)

C.I.T. Corp.,
New York 16, N. Y. (512)

Carboloy Dept.,
General Electric Co.,
11177 E. Eight Mile Road,
Detroit 32, Mich.

Century Electric Co.,
St. Louis 3, Mo. (418)

Challenge Machinery Co.,
Grand Haven, Mich. (529)

Chemical Development Corp.,
Danvers, Mass. (541)

Chicago Dial Indicator Co.,
Chicago, Ill. (525)

Chicago Rivet & Machine Co.,
Bellwood, Ill. (147)

Chicago Wheel & Mfg. Co.,
Chicago 7, Ill. (854)

Clark Controller Co.,
Cleveland 10, Ohio (840)

Clark, Cutler and McDermott
Franklin, Mass. (251)

Cleveland Instrument Co.,
Cleveland 15, Ohio (817)

Collins Microflat Co.,
Los Angeles 21, Calif. (455)

Commercial Filters Corp.,
Melrose 76, Mass. (811)

Cooper-Weymouth, Inc.,
Bridgeport, Conn. (444)

Copy-Craft, Inc.,
New York, N. Y. (549)

Crucible Steel Co.,
Pittsburgh, Pa. (830, 831, 832)

The Cushman Chuck Co.,
Hartford 2, Conn. (419, 420, 421)

Cutler-Hammer, Inc.,
Milwaukee 1, Wis. (423, 424)

Delco Products Div.,
General Motors Corp.,
Dayton 1, Ohio (523)

The DeVilbiss Co.,
Toledo 1, Ohio (155, 156)

Diehl Manufacturing Co.,
Finderne Plant,
Somerville, N. J. (429)

The DoALL Co.,
Des Plaines, Ill. (407)

Drillmation Co.,
Hazel Park, Mich. (446)

Allen B. duMont Laboratories, Inc.,
Clifton, N. J. (814)

The Dumore Co.,
Racine, Wis. (547)

Durant Manufacturing Co.,
Milwaukee 1, Wis. (151)

Eagle Signal Corp.,
Moline, Ill. (146)

Eastman Kodak Co.,
Rochester 4, N. Y. (413, 414)

Electro Dynamics Div.,
General Dynamics Corp.,
Bayonne, N. J. (341)

Emeco Corp.,
Hanover, Pa. (112)

Equipto Div.,
Aurora Equipment Co.,
Aurora, Ill. (440)

Errington Mechanical Laboratory, Inc.,
Staten Island 4, N. Y. (245)

Etco Tool Co.,
Brooklyn 37, N. Y. (527)

The Fafnir Bearing Co.,
New Britain, Conn. (131)

Fairbanks, Morse & Co.,
Fairbanks-Morse Building,
Chicago 5, Ill. (442)

Farrand Optical Co., Inc.,
New York 70, N. Y. (347)

Ferguson Machine and Tool Co.,
St. Louis 21, Mo. (852)

Firth Sterling, Inc.,
Pittsburgh 30, Pa. (837)

Formsprag Co.,
Van Dyke, Mich. (432)

Franklin Control Corp.,
Milwaukee 7, Wis. (342)

Furnas Electric Co.,
Batavia, Ill. (749)

Gear Grinding Machine Co.,
Detroit 11, Mich. (511)

General Box Co.,
Des Plaines, Ill. (532)

General Electric Co.,
New York, N. Y.

General Electric Co.,
Schenectady 5, N. Y.

Graham Transmissions, Inc.,
Menomonee Falls, Wis. (540)

Green Instrument Co., Inc.,
Cambridge 39, Mass. (548)

Hamilton Automation, Inc.,
Hamilton, Ohio (810)

Hamilton Manufacturing Co.,
Two Rivers, Wis. (751, 752)

F. Ward Harman Associates,
Halesite, L. I., N. Y. (113)

Harnischfeger Corp.,
Milwaukee 14, Wis. (129)

Hevi Duty Electric Co.,
Milwaukee 1, Wis. (252)

Hillyer Instrument Co.,
New York 13, N. Y. (427)

Hi-Lo Tool Products Co., Inc.,
Detroit 28, Mich. (878)

The Holo-Krome Screw Corp.,
Hartford 10, Conn. (431)

E. Horton Chuck Co.,
Windsor Locks, Conn. (836)

Houghton Laboratories, Inc.,
Olean, N. Y. (639)

Hyatt Bearing Div.,
General Motors Corp.,
Harrison, N. J. (519)

I-T-E Circuit Breaker Co.,
Philadelphia 30, Pa. (111)

Illinois Metal Products,
Chicago 10, Ill. (165)

Imperial Stamp & Engraving Co.,
Chicago, Ill. (825)

Industrial Diamond Association of America,
New York 16, N. Y. (139)

International Nickel Co.,
New York 5, N. Y. (814)

The Jacobs Manufacturing Co.,
West Hartford 10, Conn. (104, 105)

The Charles L. Jarvis Co.,
Middletown, Conn. (639)

Jones & Laughlin Steel Corp.,
Pittsburgh 30, Pa. (741)

Kennametal, Inc.,
Latrobe, Pa. (410, 411)

Koebel Diamond Tool Co.,
Detroit 13, Mich. (526)

Kux Machine Co.,
Chicago 26, Ill. (121, 122)

(*Turn to page 256, please*)

There have been some changes made

THE "surrey" of today cruises effortlessly at 60 miles per hour.

The horse is gone, replaced by 200 self-starting horses of steel sinew.

Today's automobile is a result of the foresight and the daring of automotive engineers in utilizing new methods, concepts and materials to further the advancement of the "horseless carriage."

We are firmly convinced we are in a position to help them take another giant step forward.

We are ready to contribute our abilities towards the building of mass-produced automotive components, which will utilize large, integrated one-piece moldings of *reinforced structural-type* plastic.

We are sure our experience can importantly affect the success of such a car—for we have already built complete exterior plastic sections of great size for airships and jet aircraft, and this rock-rugged plastic has passed exacting tests of strength and endurance.

We know we can apply the same techniques to deliver the same rewarding results for the mass-produced automotive job as we have done for the aeronautical product.

We know our success in large moldings will permit the integration of design, the elimination of costly progressive dies and parts, the reduction of tool, jig and assembly costs.

We know our presses and facilities are among the largest and most modern in the world—geared and proved in their ability to produce integrated moldings over 15 feet long, in quantity.

We feel certain that automobile manufacturers taking advantage of this engineered reinforced plastic will have a definite advantage in producing the cars of tomorrow. Join this team today—write to:

Goodyear Aircraft Corporation
Plants in Akron, Ohio and Litchfield Park, Arizona

GOODYEAR AIRCRAFT

New Materials and Methods for Industry—the result of Aircraft Pioneering

Coliseum Show Exhibitors

This Alphabetical Listing Is the Latest Available as We Go to Press
Figures in Parentheses Are Company Booth Numbers

Allied Mfg. & Sales Co.,
Chicago 22, Ill.

American Herforder Corp.,
Chicago 26, Ill.

American Positive Grip Vise Corp.,
Willimansett, Mass. (419)

American Pullmax Co., Inc.,
Chicago 14, Ill. (120)

Armstrong Brothers Tool Co.,
Chicago 31, Ill. (550)

Atlantic Instrument Corp.,
Norwood, Mass. (123)

Atlas Press Co.,
Kalamazoo 13D, Mich. (515)

Baird Machine Co.,
Stratford, Conn. (619)

Bansbach Machinery Co.,
Chicago 44, Ill. (751)

Barer Engrg. & Machinery Co., Ltd.,
Montreal 3, P. Q., Canada (553)

Black Drill Co.,
Cleveland 17, Ohio (719)

Robert Blohm & Co.,
Hamburg, Germany

Boice-Crane Co.,
Toledo 6, Ohio (715)

Burg Tool Manufacturing Co., Inc.,
Gardena, Calif. (716)

Cincinnati Manufacturing Corp.,
Cincinnati 27, Ohio

Clinton Machine Co.,
Metalmaster Div.,
Clinton, Mich. (516)

Commander Manufacturing Co.,
Chicago 24, Ill. (502)

Crystal Lake Machine Sales Corp.,
Crystal Lake, Ill. (656)

Dake Corp.,
Grand Haven, Mich.

Diamond Saw Works, Inc.,
Buffalo 2, N. Y. (409)

DoALL Midwest Co.,
Chicago 39, Ill.

DoALL Co.,
Des Plaines, Ill. (528)

Easco Products
Ann Arbor, Mich.

East Chicago Machine Tool Corp.,
East Chicago, Ind. (650)

Electro Arc Sales Co.,
Ann Arbor, Mich. (210)

Elgin Tool Works, Inc.,
Chicago 13, Ill.

Fawick Airflex Div.,
Fawick Corp.,
Cleveland 11, Ohio (245)

Fenn Manufacturing Co.,
Hartford, Conn. (609)

Fenway Machine Sales Co., Inc.,
Philadelphia 3, Pa. (210)

C. Allen Fulmer Co.,
Cincinnati, Ohio (615)

Fumer-Hone Co.,
New Britain, Conn.

James W. George Machinery Co.,
Detroit 26, Mich. (736)

Graham Machine Tool Co.,
New York 13, N. Y. (425)

Grand Specialties Co.,
Chicago 22, Ill. (422)

Grob, Inc.,
Grafton, Wis. (110)

Hammond Machinery Builders, Inc.,
Kalamazoo, Mich. (214)

Hydra-Feed Machine Tool Corp.,
So. Norwalk, Conn.

IGMA, Inc.,
New York 17, N. Y. (224)

Italian Trade Commission,
Chicago 3, Ill.

Jiffy Tool Supply Co., Inc.,
Ferndale 20, Mich. (729)

I. O. Johansson Co.,
Chicago, Ill.

J. M. Kalins Co.,
Bridgeport 8, Conn.

R. S. Kinney Co.,
Newtown, Ohio

Kling Brothers Engineering Works,
Chicago 51, Ill. (453)

Kropp Forge Co.,
Chicago 50, Ill. (742)

Lake Shore Engineering Co.,
Iron Mountain, Mich.

K. O. Lee Co.,
Aberdeen, S. D. (554)

M. B. I. Export & Import, Ltd.,
Bronx 51, N. Y. (754)

Man-Au-Cycle Corp. of America,
Brooklyn 32, N. Y. (211)

Machinery Dealers National Assn.,
Washington 6, D. C. (750)

Machinery Div.,
A. P. de Sanno & Son, Inc.,
Phoenixville, Pa. (311)

Manning, Maxwell & Morse, Inc.,
Muskegon, Mich. (647)

Maserati Corp. of America,
Westbury, L. I., N. Y. (636)

Master's with Arbogs,
Chicago 29, Ill. (122)

Mead Specialties Co.,
Chicago 41, Ill. (207)

Metal Removal Co.,
Chicago 10, Ill. (444)

Mitts & Merrill,
Saginaw, Mich. (121)

Neff, Kohlbusch & Bissell, Inc.,
Chicago 39, Ill.

Nicholas Equipment Co.,
Bellevue, Ohio (127)

Nord International Corp.,
Orange, N. J.

O'Neil-Irwin Manufacturing Co.,
Lake City, Minn. (653)

Pangborn Corp.,
Hagerstown, Md. (117)

Pioneer Tool & Engineering Co.,
Chicago 47, Ill. (220)

Portage Double-Quick Tool Co.,
Akron, Ohio

Portage Machine Co.,
Akron, Ohio (521)

Production Machine Co.,
Greenfield, Mass. (622)

Raytheon Mfg. Co.,
Waltham, Mass. (111)

Reeves Pulley Co.,
Columbus, Ind. (748)

S & S Machinery Co.,
Brooklyn 32, N. Y.

Geo. T. Schmidt, Inc.,
Chicago 13, Ill. (641)

Sealol Corp.,
Providence 5, R. I. (417)

Service Machine Co.,
Chicago 20, Ill. (126)

Sheldon Machine Co., Inc.,
Chicago 41, Ill. (702)

Simplex Machine Tool Corp.,
Milwaukee 46, Wis. (625)

SKIL Corp.,
Chicago 30, Ill. (544)

Sleeper & Hartley, Inc.,
Worcester, Mass. (617)

South Bend Lathe Works,
South Bend 22, Ind. (543)

U. S. Burke Machine Tool Div.,
Cincinnati 27, Ohio (616)

Walker-Turner Div.,
Kearney & Trecker Corp.,
Plainfield, N. J. (719)

Wells Manufacturing Corp.,
Three Rivers, Mich. (644)

K. R. Wilson, Inc.,
Arcade, New York (114)

Zagar Tool, Inc.,
Cleveland 23, Ohio (461)

Thompson Valve Div. Moving Into New Cleveland Facility

Latest production facility to go into operation for Thompson Products, Inc., is a fully-equipped and modernized office and factory at 1455 E. 185th Street, Cleveland, O., new home of Thompson's Valve Div. Offices of the divisions are being moved from the Tapco Plant in Euclid, O., to the modern $5.5 million manufacturing center.

The event coincidentally marks 50 years of valve manufacture by Thompson Products during which it has turned out more than 850 million valves for automobiles, trucks, tractors, and stationary engines. The company is also a leading producer of aircraft valves.

Simultaneously with the moving of equipment into the E. 185th Street plant from the Valve Division's three present Greater Cleveland manufacturing locations, further expansion is underway which will enlarge the new facility to nearly a half million sq ft. All 2500 employees of the Division will move with their jobs to the new location.

never before

has any piston ring won such overwhelming acceptance in so short a time... as the new

PERFECT CIRCLE

type "98" chrome oil ring!

Of the 4,923,850 passenger cars produced from January 1 through July 30, 1955—almost half* were equipped with the NEW PERFECT CIRCLE TYPE "98" CHROME OIL RING.

* 44.9% were new Perfect Circle Type "98" Chrome Oil Rings.

* 55.1% were all other oil ring types combined, including other Perfect Circle oil ring types.

PERFECT CIRCLE piston rings

PREFERRED BY MORE PEOPLE THAN ANY OTHER BRAND!

Perfect Circle Corporation, Hagerstown, Indiana
The Perfect Circle Co., Ltd., Toronto, Ontario

TORRINGTON

NB SERIES NEEDLE BEARINGS

For Oscillating Motion or Heavy Rolling Loads

Torrington NB Series Needle Bearings employ the same needle roller principle as the famous DC Type Bearing.

They are available in the five types illustrated, all being of nonseparable construction and designed for periodic relubrication. Outer and inner races are of high carbon, chrome steel, hardened and precision ground.

Like the DC Type, the compact design of NB Series Needle Bearings permits saving in size and weight of surrounding parts.

Torrington NB Series Needle Bearings have been used extensively in the aircraft industry and for ordnance work where their extremely high static capacity and anti-friction characteristics enable them to withstand heavy impact loads.

Designs can be modified to meet industrial applications involving rotating motion.

Type NBC—oscillating motion only. Designed specifically for applications in which the OD is supported by a housing and the washers are backed up by clamping surfaces.

Types NBE and NBK—oscillating motion only. Self-aligning. Designed for applications where it is difficult to obtain alignment during assembly or where deflections make a self-aligning bearing desirable.

Types NBF and NBL—heavy rolling loads. Designed for use as rollers under heavy loads at slow speeds.

See our new Needle Bearing Catalog in the 1955 Sweet's Product Design File—or write direct for Catalog No. 55.

THE TORRINGTON COMPANY

Torrington, Conn. South Bend 21, Ind.

District offices and distributors in principal cities of United States and Canada

TORRINGTON NEEDLE BEARINGS

Needle • Spherical Roller • Tapered Roller • Cylindrical Roller Ball • Needle Rollers

Free INFORMATION SERVICE

Use either of these postcards for Free Literature listed below, or for more information on New Production Equipment and New Products described in this issue.

USE THIS POSTCARD

FREE LITERATURE

Heat Treating 1

"How to Plan Your Toolroom Heat Treating Department" — a practical guide to assist those planning new, enlarged or redesigned heat treating departments—describes how to select furnaces of the proper size, shows recommended layouts, gives approximate floor space requirements and lists auxiliary equipment such as tongs, straightening presses, work benches, hardness testers, etc. Furnace Div., *Lindberg Engineering Co.*

Titanium Alloy 2

A bulletin describing MST 6A1-4V titanium alloy covers metallurgy and chemistry of the alloy, properties, and recommended heat treatment, forging, and welding procedures. *Mallory-Sharon Titanium Corp.*

Gear Shapers 3

Details on models 18136 and 18206 Shear-Speed gear shapers are given in bulletin SS-55, eight pages. These models have the capacity to shape gears up to 20-in. diameter with six-in. face width and diametral pitch of 2 at a high rate of production. *Michigan Tool Co.*

Slitting Lines 4

Multiple rotary slitters, uncoilers, recoilers, scrap choppers and coil cars are featured in a revised handbook of 76 pages. The book contains information on basic considerations in the choice and operation of slitting lines, analysis of the slitting cycle, etc. *The Yoder Co.*

Steel Strapping 5

Heavy duty flat steel strapping equipment and accessory items, and photographs of the application of this equipment, are shown in an eight-page bulletin. *Gerrard Steel Strapping Div., U. S. Steel Corp.*

Vacuum Pumps 6

Faster pump-down of vacuum metallizing chambers is possible with the Ring-Jet diffusion and booster pumps recently introduced. Series of bulletins on 10, 14 and 16-in. Series 160 diffusion pumps, and 4, 6, 10 and 16 in. booster pumps. *F. J. Stokes Machine Co.*

Speed Changes 7

Operating advantages of Texrope Vari-Pitch speed changers, in 12 sizes from 1 to 75 hp with output speeds ranging up to 2900 rpm, are described in bulletin 20B6013D. *Allis-Chalmers Manufacturing Co.*

Tool Steel Guide 8

Technical data on more than 50 types of tool steels and cold finished products has been published in a 70-page brochure. Includes information on high speed steels, die steels for hot and cold work, carbon and carbon-vanadium tool steels, chrome vanadium tool steels and tool steels for special purposes. Sections also are devoted to cold finished products and powdered metal. *Vanadium-Alloys Steel Co.*

VOID after Nov. 1 — Circle numbers for Free Literature, or New Equipment Information — 9/1/55

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120
121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140
141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160
161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180
181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	179	198	199	200
201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220
221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240

NAME ..... TITLE .....
(Please Print)

COMPANY OR BUSINESS .....

ADDRESS ..... (CITY) ..... (ZONE) ..... (STATE)

FIRST CLASS
Permit No. 36
(Sec. 34.9 P.L.&R.)
New York, N. Y.

BUSINESS REPLY CARD
No Postage Stamp Necessary If Mailed in the United States

POSTAGE WILL BE PAID BY

AUTOMOTIVE INDUSTRIES
P. O. Box 66,
Village Station,
New York 14, N. Y.

Readers Service Dept.

Lockbolts 9

A booklet on Commercial Lockbolts, a new product designed for quick, high clinching and permanent fastening, is available from *Townsend Co.*

Induction Heating 10

A new 12-page bulletin describing induction heating units for heat treating, brazing, soldering, and heating for forming or forging, gives descriptions and technical data on 5, 10, 25 and 50-kw sizes. Included are water systems diagrams and a discussion of standard accessory equipment. Bulletin 1441. *High Frequency Heating Div., Lindberg Engineering Co.*

Liquid Blasting 11

Bulletin No. 1403 on Hydro-Finish liquid blast cleaning equipment features all models of the EZ-2 and EZ-3 machines for deburring, surface finishing and lubrication control, surface preparation for coating, dye and mold maintenance, and general maintenance. *Pangborn Corp.*

Steel Data 12

A 16-page pocket-sized folder lists all of the company's 85 current technical data sheets and booklets. Stainless, electrical, tool and die steels, and other high alloy specialties are covered. *Allegheny Ludlum Steel Corp.*

Drilling Machine 13

Catalog 700 gives an overall picture of a line of hydraulic feed, vertical way-type machines, with fixed or variable center, multiple spindles. *Barnes Drill Co.*

Thread Gages 14

Roll thread snap gages are discussed and cataloged in circular 585 offered by *Pratt & Whitney Div., Niles-Bement-Pond Co.*

USE THIS POSTCARD

Industrial Heating 15

A handbook providing non-technical basic concepts of industrial heat processing and heat control is now being distributed by *Michigan Oven Co.*

Profilometer 16

A new 12-page illustrated catalog of Profilometer equipment for shop measurement of surface roughness describes the portable Amplimeter, tracers for manual and mechanical operation, and motor-driven piloting equipment for straight-line, short-stroke and circular tracing. *Micrometrical Manufacturing Co.*

Control System 17

An electrical control system for predetermined repeat or non-repeat cycle on any machine with a mechanical tripping mechanism is described in bulletin 55-1, published by *Security Controls, Inc.*

Gear Manual 18

The new gear manual includes 76 pages of illustrations, diagrams, definitions, tables, charts and explanations regarding all types of gears. A simplified method is shown for calculating horsepower ratings of all types of gearing. Catalog G-655. *Philadelphia Gear Works, Inc.*

Magnetic Brake 19

Transmission bulletin No. 226-D, covering their standard line of magnetic brakes and clutches, includes specifications of the companion new line of magnetic brakes for re-rated NEMA frame sizes. *Stearns Magnetic, Inc.*

Lube Pumps 20

Four bulletins describing their lubrication pumps each refer to a particular series of pumps and gives a detailed description of design features, with diagrams and operating specifications. The oil and grease reservoir assembles are illustrated; dimensions and capacities are tabulated. No. 5531 double acting hydraulic; No. 5533 single acting hydraulic; No. 5535 single acting pneumatic; No. 5537 cam driven mechanical. *Trabon Engineering Corp.*

Gage Lab 21

Details of its new affiliate, Midwest Gage Laboratory, are explained in a 16-page booklet. *Size Control Co.*

A I Index 22

Check 22 for an index to Vol. 112 (Jan. 1 to June 15, 1955) of AUTOMOTIVE INDUSTRIES.

BUSINESS REPLY CARD

No Postage Stamp Necessary if Mailed in the United States

FIRST CLASS Permit No. 36 (Sec. 34.9 P.L.&R.) New York, N. Y.

POSTAGE WILL BE PAID BY

AUTOMOTIVE INDUSTRIES

P. O. Box 66,

Village Station,

New York 14, N. Y.

Readers Service Dept.

VOID after Nov. 1

Circle numbers for Free Literature, or New Equipment Information

9/1/55

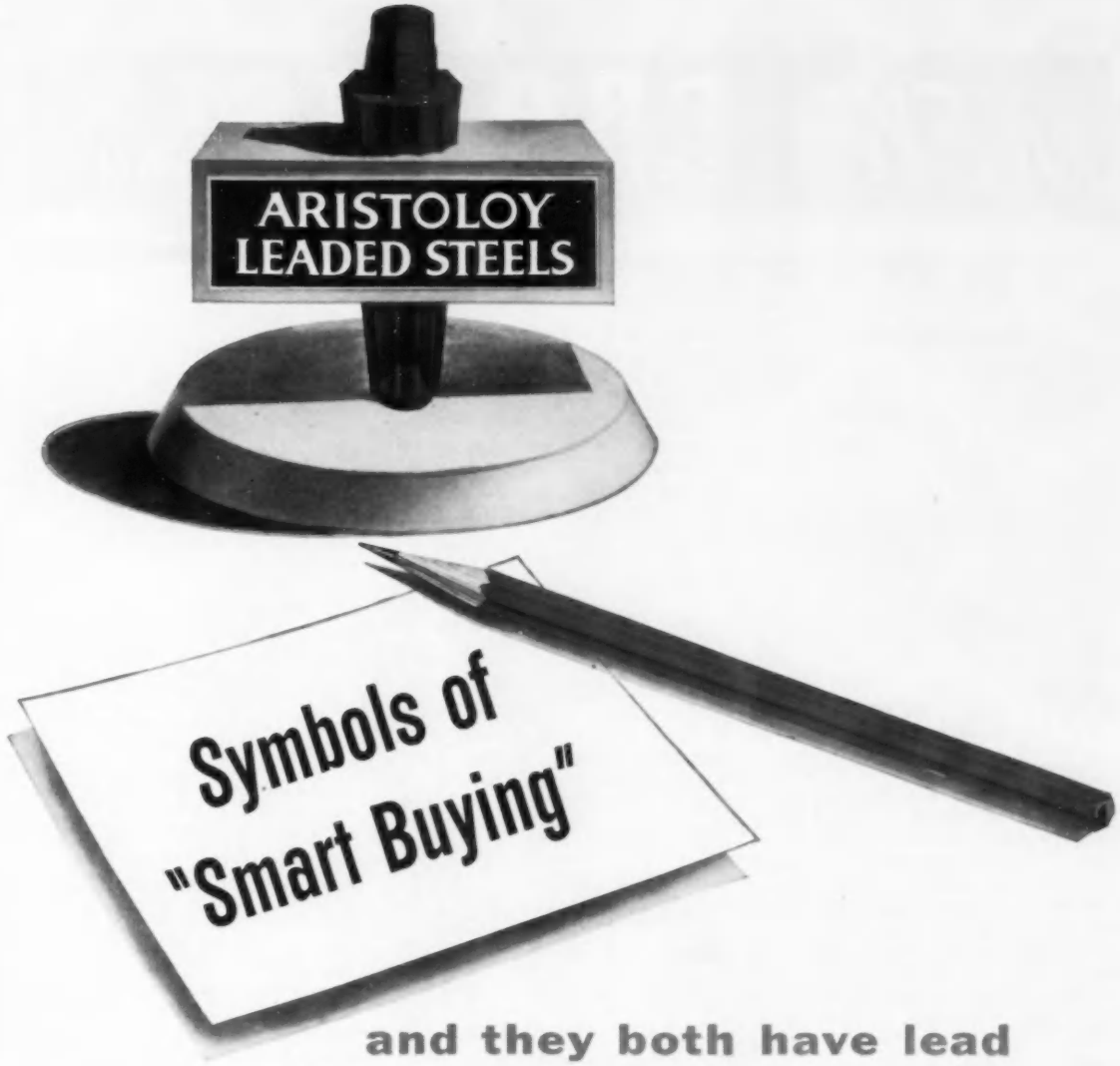
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120
121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140
141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160
161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180
181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200
201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220
221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240

NAME ..... TITLE

(Please Print)

COMPANY OR BUSINESS .....

ADDRESS ..... (No. & STREET) ..... (CITY) ..... (ZONE) ..... (STATE)



and they both have lead

Today's Purchasing Agent is recognized as part of the executive management team. Why? Because the modern PA, using value analysis, is looking beyond initial cost to specify products that can be purchased to be produced at a profit.

Parts machined from Ledloy* give production line savings.

Freer machining, faster feeds and speeds and longer tool life add value through each manufacturing step.

Because Ledloy cuts clean for finer finish, its use sometimes eliminates final machining.

The end result—a total saving accumulated step by step from rough stock to finished product that makes Ledloy a "smart buy."

*Inland Ledloy License

COPPERWELD STEEL COMPANY / STEEL DIVISION / WARREN, OHIO

NEW PRODUCTS AUTOMOTIVE-AVIATION

FOR ADDITIONAL INFORMATION, please use reply card on PAGE 89

Torquing Bolt

The Tru-Load bolt contains, built in axially, a pin of the same material as the bolt. The pin is machined precisely so that it is flush with the top

of the bolt. When a preload is placed on the bolt, the bolt elongates and the pin, which is moored at the bottom but loose to 0.005 in. on each side, is free to move downward with the lower half of the bolt. The amount the top of the pin has deflected is then measured very simply with a small hand gage. The gage is calibrated for a direct pounds-per-square-inch measurement. It is said to be accurate within ± 2000 psi. *Bland Burner Co.*

Circle 235 on postcard for more data

Smooth Tube

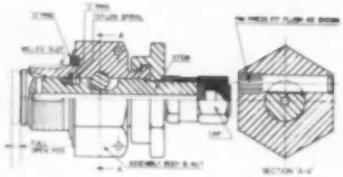
Mirror-like inside surface finish is said to be the latest refinement in cold-drawn electricweld steel tubing, reportedly superior to many honed finishes. The cold-drawn product is said to combine the advantages of the electricweld process with the advantages of cold working. The tubing can carry heavy torsion loads. It resists high-frequency vibration and has a favorable weight-to-strength ratio in applications in which the loading is in all directions.

The tubing is drawn over a mandrel and through a ring die simultaneously. In applications calling for close control of the outside diameter only, the tubing is drawn through the die, but not over the mandrel. This is called "sink drawing." Tubing is produced in OD sizes ranging from ⅜ to 2¼ in. Wall thicknesses range from 0.035 in. minimum to 0.134 in. maximum. Minimum tensile strengths on the sink drawn tubing range up to 70,000 psi, and minimum yield strengths 55,000 psi. Drawn-over-mandrel tubing is supplied to minimum tensile strengths up to 70,000 psi, and minimum yield strengths up to 65,000 psi. *Jones & Laughlin Steel Corp.*

Circle 236 on postcard for more data

Charging Valve

Cross-sections of the critical working areas of nitrogen charging valve have been increased. Designed for the Army, Navy and Air Force, the valve is now available for industrial

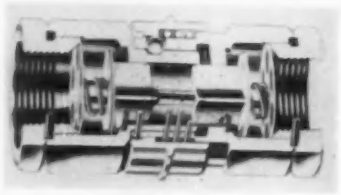


applications. It is interchangeable with any previous AN valve being used to charge hydraulic and pneumatic systems with gas. Designed for a 5000 psi working pressure and 20,000 psi burst pressure, the valves are being used in landing gear, accumulators and similar applications. A prime safety factor is the pin built into the locking head which prevents the stem from dropping into the body of the gas cylinder eliminating the resultant equipment damage. An adjustable stem that works as an ice crusher eliminates ice formation around the gas inlet ports. *Superior Hydraulics Div., Superior Pipe Specialties Co.*

Circle 237 on postcard for more data

Quick Coupling

A QUICK-CONNECT, quick-disconnect coupling, which can be used for



high pressure as well as gravity flow and vacuum, is now being produced. The "E" coupling provides instant line shut-off when equipped with valves. In small sizes it holds vacuums in the micron range in both connected and disconnected positions. The special packer gives positive seal when the coupling is connected. The coupling is available without valves if desired. It is furnished in alloy steel, brass, aluminum, and stainless steel. *Snap-Tite, Inc.*

Circle 238 on postcard for more data

Aircraft Relief Valve

A relief valve having a thermal venting feature will control maximum system oil temperature as well as maximum system pressure. Series EA 50004 is basically a 3000 psi relief valve which includes an integral temperature control element, preventing fluid in the working circuit from exceeding a maximum safe operating temperature of 270 F. The venting action of a poppet causes the relief valve to open at a much lower pressure than its relief setting. With the relief valve vented, pump delivery is unloaded freely back to the reservoir at very low pressure. The thermal sensing element closes at 230 F. Full flow rating is 22 gpm at 3700 psi. *Vickers, Inc.*

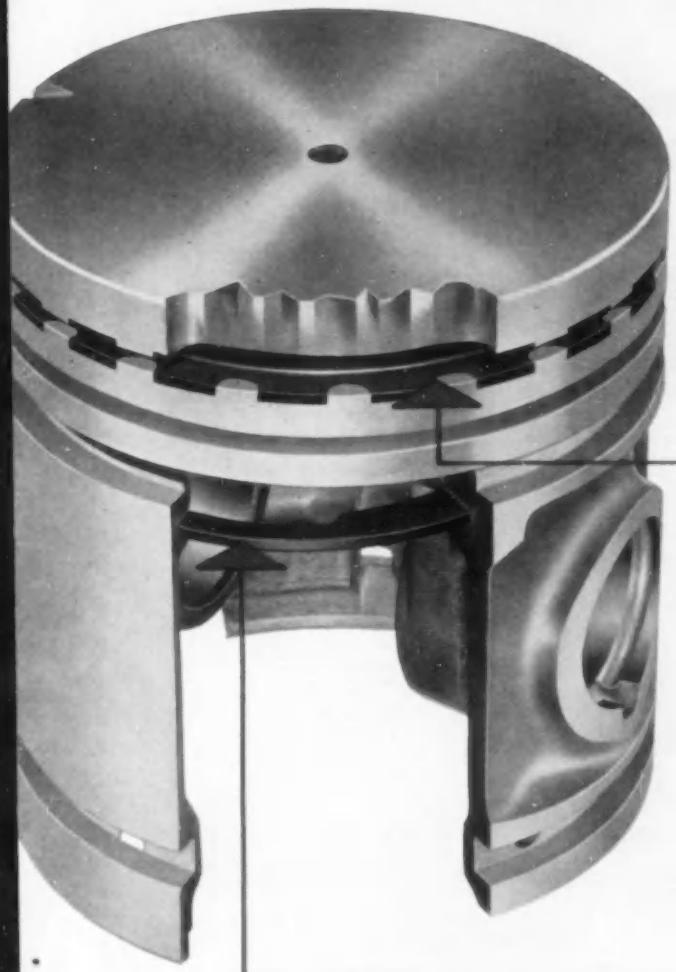
Circle 239 on postcard for more data

Rolled Tube

Special forming mills are needed to produce a so-called tight-butted tube which is said to be stronger than tubing with swaged butt seams.—*Acme Tube Corp.*

Circle 240 on postcard for more data

NOW! STERLING CONFORMATIC PISTONS



CONFORMATIC STEEL CONTROL MEMBER, anchored at the pin bosses only, controls skirt clearance . . . hot or cold! The metered steel insert allows you to specify the piston clearance you want for your engine. (Clearances from zero to ½ thousandth inch are generally recommended.)

are available with LOW COST

Intra-Cast* STEEL-LINED GROOVES

***Steel protection—top and bottom*—gives sensationally longer life to rings and grooves.**

This ring is *integrally cast* into the piston . . . positioned so that when the grooves are machined, the top ring groove is *lined with steel* and has islands of aluminum for ring cooling. This Intra-Cast steel-protected groove resists enlargement and materially reduces top ring land wear and rounding. And, it does it at far less cost than other methods.

** Tradename Registered*

STERLING ALUMINUM PRODUCTS INC.

ST. LOUIS, MISSOURI

Exhibitors at MACHINE TOOL SHOW

(Continued from page 238)

Landis Machine Co.,
Waynesboro, Pa. (1406)

Landis Tool Co.,
Waynesboro, Pa. (1117)

LaPointe Machine Tool Co.,
Hudson, Mass. (707)

R. K. LeBlond Machine Tool Co.,
Cincinnati 8, Ohio (1313)

The Lees-Bradner Co.,
Cleveland 11, Ohio (701)

Leland-Gifford Co.,
Worcester 1, Mass. (321)

The Lodge & Shipley Co.,
Cincinnati 25, Ohio (502)

Logansport Machine Co., Inc.,
Logansport, Ind. (1114)

Maatison Machine Works,
Rockford, Ill. (1422)

Michigan Tool Co.,
Detroit 12, Mich. (1220)

Micromatic Hone Corp.,
Detroit 38, Mich. (1211)

The Minster Machine Co.,
Minster, Ohio (1410)

Moline Tool Co.,
Moline, Ill. (1304)

Monarch Machine Tool Co.,
Sidney, Ohio (920)

The Morris Machine Tool Co.,
Cincinnati 3, Ohio (912)

Morton Mfg. Co.,
Muskegon Heights, Mich. (408)

The Motch & Merryweather Machinery Co.,
Cleveland 13, Ohio (606)

The National Acme Co.,
Cleveland 8, Ohio (705, 324)

National Automatic Tool Co., Inc.,
Richmond, Ind. (1123)

National Broach & Machine Co.,
Detroit 13, Mich. (1215)

National Machinery Co.,
Tiffin, Ohio (918)

The Nebel Machine Tool Co.,
Cincinnati 25, Ohio (511)

The New Britain Machine Co.,
New Britain, Conn. (1419)

Niagara Machine & Tool Works,
Buffalo 11, N. Y. (715)

Norton Co.,
Worcester 6, Mass. (516)

Ohio Machine Tool Co.
Kenton, Ohio (301)

Oliver Instrument Co.,
Adrian, Mich. (604)

Onsrud Machine Works, Inc.,
Chicago 47, Ill. (812)

The Oster Mfg. Co.,
Cleveland 3, Ohio (216)

Parker-Majestic, Inc.,
Detroit 7, Mich. (415)

Peerless Machine Co.,
Racine, Wis. (322)

Pope Machinery Corp.,
Haverhill, Mass. (117)

Pratt & Whitney,
Division Niles-Bement-Pond Co.,
West Hartford 1, Conn. (1219)

Racine Hydraulics & Machy., Inc.,
Racine, Wis. (102)

Reed Rolled Thread Die Co.,
Holden, Mass. (703)

Rehnberg-Jacobson Mfg. Co.,
Rockford, Ill. (505)

Reid Bros. Co., Inc.,
Beverly, Mass. (108)

Rivett Lathe & Grinder, Inc.,
Brighton, Boston 35, Mass. (805)

Rockford Machine Tool Co.,
Rockford, Ill. (1423)

Seneca Falls Machine Co.,
Seneca Falls, N. Y. (1013)

Sheffield Corp.,
Dayton 1, Ohio (1305)

Sidney Machine Tool Co.,
Sidney, Ohio (1116)

Snow Mfg. Co.,
Bellwood, Ill. (213)

Snyder Tool & Engrg. Co.,
Detroit 7, Mich. (1222)

Socony Mobil Oil Co.,
New York 4, N. Y. (314)

Springfield Machine Tool Co.,
Springfield 99, Ohio (612)

Sun Oil Co.,
Philadelphia 3, Pa. (112)

Sundstrand Machine Tool Co.,
Rockford, Ill. (1412)

Taft-Peirce Mfg. Co.,
Woonsocket, R. I. (811)

The Thompson Grinder Co.,
Springfield, Ohio (1407)

U. S. Tool Co.,
Ampere (East Orange), N. J. (215)

Van Norman Co.,
Springfield 7, Mass. (905)

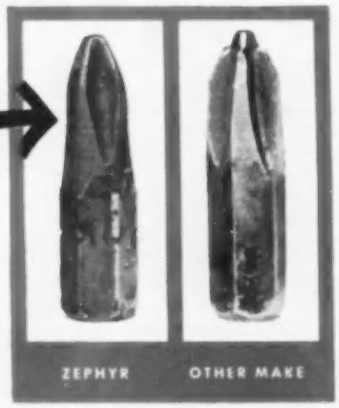
Vickers, Inc.,
Division of the Sperry Corp.,
Detroit 32, Mich. (814)

The Warner & Swasey Co.,
Cleveland 3, Ohio (717)

Wiedemann Co.,
Philadelphia 32, Pa. (1420)

Wysong & Miles Co.,
Greensboro, N. C. (913)

Compare These Bits...



FORGING MAKES ZEPHYR BITS TWICE AS TOUGH! Only Zephyr forges bits! It's a unique and exclusive process which combined with carefully controlled heat treating gives Zephyr Bits uniform molecular strength. That's why they perform twice as long.

WHY ZEPHYR INSERT AND POWER BITS ARE BEST

Now look at the unretouched photographs. Both went through the same rugged driving test. But the Zephyr Bit only, looks good as new. The other is badly spent.

If you're troubled about bit performance, it's time to try Zephyr Bits. You will find they save you time and money by consistently long satisfactory service.

ZEPHYR

Insert and Power Bits

FOR PRODUCTION SCREWDRIVING WITH PHILLIPS OR FREARSON FASTENERS

ZEPHYR MANUFACTURING COMPANY, INC.
Accessories Division
Inglewood, California

ZEPHYR MANUFACTURING COMPANY, INC.
Accessories Division, Dept. C · Inglewood, California
PLEASE SEND ME ZEPHYR CATALOG NO. 12B.

COMPANY

DIVISION OR DEPT. HEAD

ADDRESS

CITY ZONE STATE

A Good Team to Team with

...BEFORE FREEZING YOUR NEW MODEL DESIGNS FOR PRODUCTION

Having literally grown up with America's No. 1 industry, Aetna, today, is a preferred supplier of a wide range of ball and roller bearings and custom-made parts for nearly every type of on-and-off-the-road automotive vehicle.

Why? First, we believe, it is because of the consistent, superior performance of our products . . . secondly, because of the exceptional creative engineering efforts we put behind the job of serving manufacturers—to help improve their products, assure speedy assembly and reduce costs. This, we feel, adds up to a good way of doing business . . . makes us good people to do business with. We hope you will try it and see.

Aetna

AETNA BALL AND ROLLER BEARING COMPANY

DIVISION OF PARKERSBURG-AETNA CORPORATION

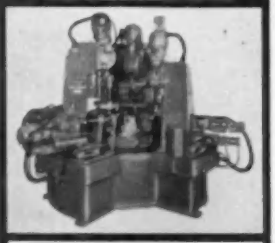
4600 Schubert Avenue • Chicago 39, Illinois

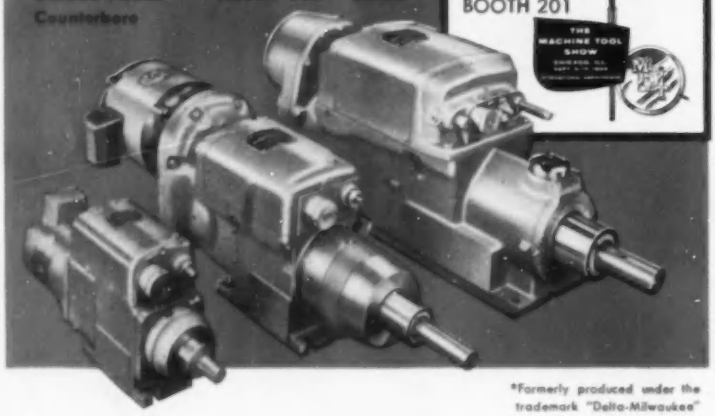
In Detroit—Sam T. Keller, 2457 Woodward Ave.

Standard and Special Ball Thrust Bearings • Angular Contact Ball Bearings • Special Roller Bearings • Ball Retainers • Hardened and Ground Washers • Sleeves • Bushings • Miscellaneous Parts

HARTFORD
Special
DRILL UNITS*
combined with our other
STANDARDIZED COMPONENTS
offer **LOW COST AUTOMATION**
on these operations:

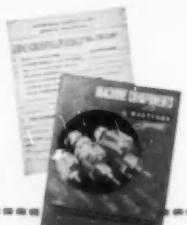
Drill—Single and Multiple Spindle	Ream	Tap
Deep Hole Drill	Spot Face	Bore
Countersink	Center	Mill
Outside Thread	Chamfer	Face
Counterbore	Hollow Mill	Recess





*Formerly produced under the trademark "Delta-Milwaukee" by the Rockwell Mfg. Company

Absolute depth and feed control plus high rapid traverse make "Hartford Special" Drill Units workhorses on high production jobs requiring accurate machining operations. These flexible components can be combined with other Hartford standardized components to provide low cost automation to every manufacturer through machines of his own construction. Our large staff of Sales Engineers is ready to study your processing problems and make recommendations to lower your manufacturing costs.



HARTFORD *Special*

MACHINE TOOL DIVISION
THE HARTFORD SPECIAL MACHINERY CO.
201 Homestead Avenue, Hartford 12, Conn.
B-503-9

☐ Have Field Engineer call.
☐ Send Application Data Sheet and Descriptive Bulletin.

Name_____
Company_____
Address_____
City_____ Zone____ State_____

CALENDAR
OF COMING SHOWS AND MEETINGS

General Motors Powerama, South Lake Shore Drive, Chicago, Ill. ..... Aug. 31-Sept. 25
National Aircraft Show, International Airport, Phila., Pa. ..Sept. 3-5
AMTDA Annual Meeting, Blackstone Hotel, Chicago, Ill. ...Sept. 5-6
Farnborough Air Show, England Sept. 5-11
Industrial Truck Association, fall meeting, Greenbrier, White Sulphur Springs, W. Va. ..... Sept. 6-8
Paris Automobile Show, France Oct. 6-16
NMTBA Machine Tool Show, International Amphitheater, Chicago, Ill. ..... Sept. 6-17
Production Engineering Show, Navy Pier, Chicago, Ill. ..... Sept. 6-17
Coliseum Machinery Show, Chicago, Ill. ..... Sept. 6-17
Metal Powder Association, fall closed meeting, Hot Springs, Va. ..... Sept. 9-11
SAE Golden Anniversary Tractor Meeting and Production Forum, Hotel Schroeder, Milwaukee, Wis. ..... Sept. 12-15
Instrument Society of America, 10th annual Instrument-Automation Conference and Exhibit, Shrine Exposition Hall and Auditorium, Los Angeles, Calif...Sept. 12-16
National Petroleum Association, annual meeting, Traymore Hotel, Atlantic City, N. J. ..... Sept. 14-16
National Industrial Packaging and Materials Handling Show, Kingsbridge Armory, New York, N. Y. ..... Sept. 20-22
AAMVA Annual Conference, Samoset Hotel, Rockland, Me. ..Sept. 20-23
ASME Annual Meeting, Roosevelt Hotel, New Orleans, La...Sept. 25-29
First Trade Fair of the Atomic Industry, Sheraton-Park Hotel, Washington, D. C. ..... Sept. 26-30
AIEE and IRE Industrial Electronics Conference, Engineering Society Auditorium, Detroit, Mich. ..... Sept. 28-29
AIEE National Electronics Conference, Chicago, Ill. ..... Oct. 3-7
AIEE Fall General Meeting, Hotel Morrison, Chicago, Ill. ..... Oct. 3-7
World Plastics Fair and Trade Exposition, National Guard Armory, Los Angeles, Calif. Oct. 5-9
ASME-ASLE Joint Lubrication Conference, Antlers Hotel, Indianapolis, Ind. ..... Oct. 10-12
SAE Golden Anniversary Aeronautic Meeting, Production Forum, and Engineering Display, Hotel Statler, Los Angeles, Calif..Oct. 11-15
National Metal Exposition, Convention Hall, Philadelphia, Pa. Oct. 17-21
International Motor Show, Earls Court, London, England... Oct. 19-29
AGMA Semi-annual Meeting, Edgewater Beach Hotel, Chicago, Ill. Oct. 23-26
Canadian Industrial Tool and Equipment Show, Montreal, Canada ..... Oct. 24-28
ASME-IME Joint Conference on Combustion, London, England Oct. 25-27
ASBE Annual Technical Convention, Detroit, Mich. ..... Oct. 26-28
Automobile Old Timers, 16th anniversary dinner Waldorf-Astoria Hotel, New York, N. Y..Oct. 28
SAE Golden Anniversary National Transportation Meeting, Hotel Chase, St. Louis, Mo. Oct. 31-Nov. 2

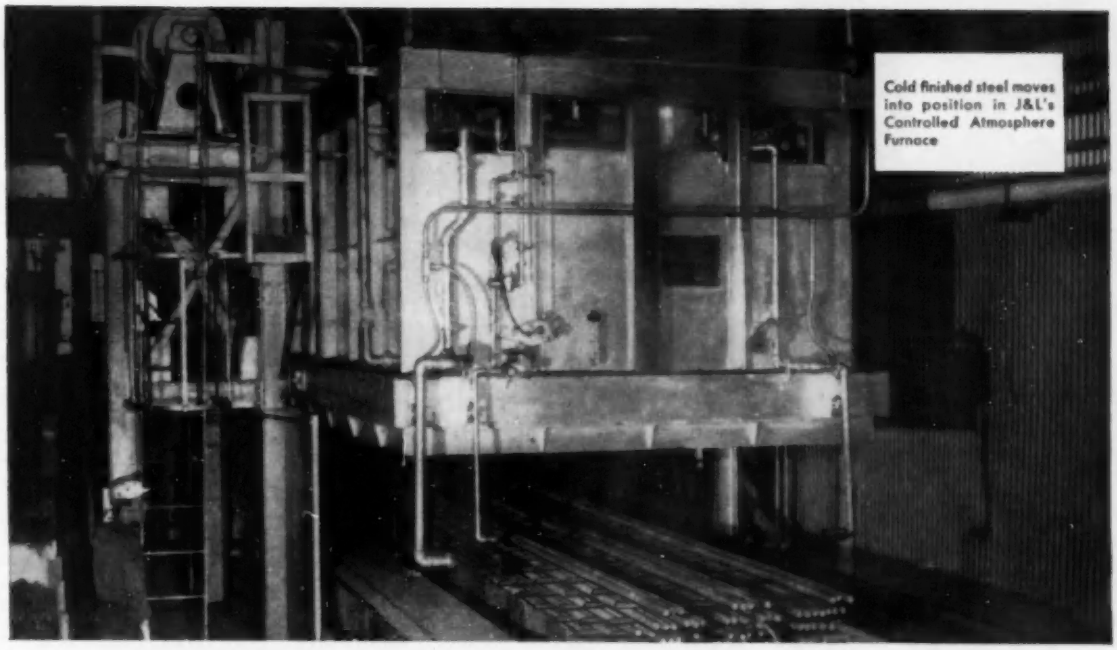
Cut Your Production Costs

whatever treatment you need:

- bright annealing
- case carburizing
- normalizing
- stress relieving
- carbon restoration

thermal treatment in prepared atmosphere furnace

saves you time
lowers over-all costs



Cold finished steel moves into position in J&L's Controlled Atmosphere Furnace

Why incur the trouble and costs of thermal treatments when J&L can do the job for you . . . quickly and economically? J&L's Controlled Atmosphere Furnace can be employed to improve the machinability or to meet the mechanical properties you need in your bar stock.

Order J&L Cold Finished Bars—thermally treated to the needs of your production line.

Jones & Laughlin
STEEL CORPORATION — *Pittsburgh*

J&L STEEL

Jones & Laughlin Steel Corp., Dept. 430
3 Gateway Center, Pittsburgh 30, Pa.

Without obligation please send me your booklet "Extra Services to Users of Cold Finished Steel."

Name _____

Title _____

Company _____

Address _____

City _____ Zone ____ State _____

looking for the right tube in

WELDED STAINLESS?

Check Standard's Complete Range of tube and pipe sizes!

Whether it's for a pressure, mechanical, sanitary or ornamental use – Standard offers you a convenient "one source" answer to your welded Stainless Steel Tubing need.

TUBE SIZES: ¼" to 4" OD .025 to .148

PIPE SIZES: ⅛" to 2" IPS Schedule 40

TYPES: 430, 302, 304, 309, 316, 321, 347; and others including low-carbon grades.

SHAPES: Squares, Rectangles and Special Shapes

PIPE SIZES: ⅛" to 4" IPS Schedules 5 & 10

Send for Stainless Folder! Our engineers will gladly assist you in your selection of the tube best suited to your needs! Write today!

Specify Standard for

- WELDED STAINLESS TUBING AND PIPE
- WELDED CARBON STEEL MECHANICAL TUBING
- BOILER AND HEAT EXCHANGER TUBING
- EXCLUSIVE "RIGIDIZED" PATTERNS

SHORTIES

U. S. motor vehicles are traveling a record distance of more than half a trillion miles per year. Gasoline consumption has hit a new record of more than 42.7 billion gallons a year.

•

More families than ever now own automobiles in America. The latest count is 35 million—70 per cent of all families.

•

About 78,000 acres of cotton go annually into the upholstery of cars and trucks, along with some three million lb of wool.

•

Since the end of World War II, well over half of the expenditures of the Federal Government have been devoted to military and related outlays.

•

Wind whistling over wings and fuselage of planes at today's top military speeds is 10 to 12 times greater than any hurricane ever recorded.

•

Insulated electric wire in a modern transport would stretch 16 miles.

•

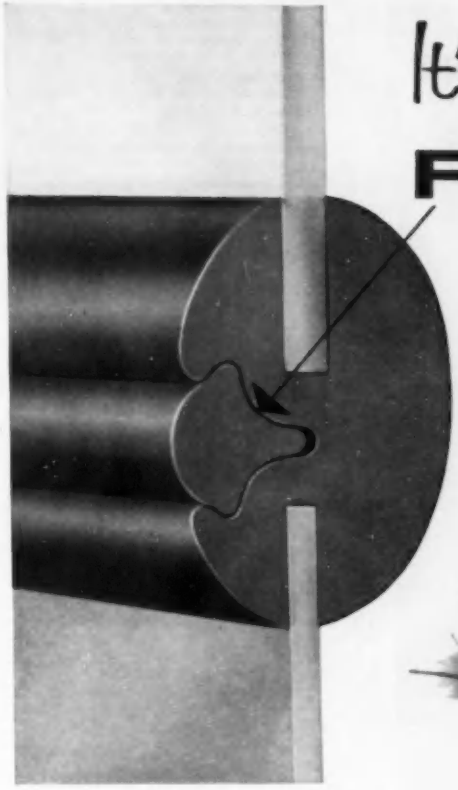
The smallest of 569 forgings and castings used in one jet fighter is the size of a pack of king-sized cigarettes. The largest is 10 ft long, and shaped like an overgrown hockey stick.

•

More than 61 per cent of all cars sold in 1954—new and used—were sold on installment credit, and it is likely that this percentage will be slightly greater in 1955.

•

Southern population has increased 16.1 per cent since 1941, compared with 19.8 per cent nationally; but southern passenger car registrations have jumped 73.8 per cent, while those of the remaining 32 states were rising 51.4 per cent.



It's this separate **FILLER STRIP**

that puts more pressure on the fence and the glass... providing a permanent leak proof seal!

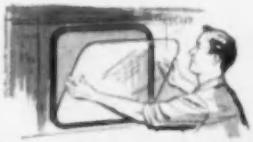
If you're having trouble with windows and windshields that only slow up the rain, then you've probably looked longingly at a competitor's model and asked yourself . . . "how do they do it?" At first glance, their seals seem no different from your own . . . and yet—look closely. See that filler strip? That means they're using Inland's new self-sealing weather strip. No wonder they have no leak problems.

The installer compresses the strip *after* the glass is in place. No more forcing the glass into a groove. What's more, Inland weather strip is, by far, the easiest to install!

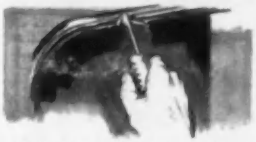
INLAND MANUFACTURING DIVISION
General Motors Corporation • Dayton, Ohio

The filler strip makes possible these other Inland advantages!

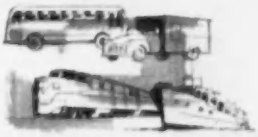
FREEDOM OF DESIGN! No provision need be made for moldings, channels, binder strips or cement when designing with Inland Self-Sealing Weather Strip.



EASY GLASS REPLACEMENT! Less lost time for vehicles. A one-man job, broken glass can be replaced on the road, if necessary.



A POSITIVE SEAL! This filler strip puts more pressure on the fence and the glass—assures complete, positive weather proofing every time.



VERSATILITY! Ideal for vehicles, booths, trains, gasoline pumps, buildings, marine windows—for positive, permanent sealing of any window or panel!

INLAND MANUFACTURING

Self-Sealing

(PATENTED)

WEATHER STRIP

Lapeer Manufacturing Co.,
Detroit 2, Mich. (510)

LaSalle Steel Co.,
Hammond, Ind. (133, 134)

Lee Spring Co., Inc.,
Brooklyn 1, New York (157)

Lehmann Boring Tool Div.,
Fulton Iron Works Co.,
St. Louis 10, Mo.

Leland Electric Co.,
Div. American Machine & Foundry Co.,
Dayton 1, Ohio (349)

Linemaster Switch Corp.,
Woodstock, Conn. (552)

Link-Belt Co.,
Chicago 1, Ill. (433, 434, 435)

The Lufkin Rule Co.,
Saginaw, Mich. (572)

Exhibitors at ENGINEERING SHOW

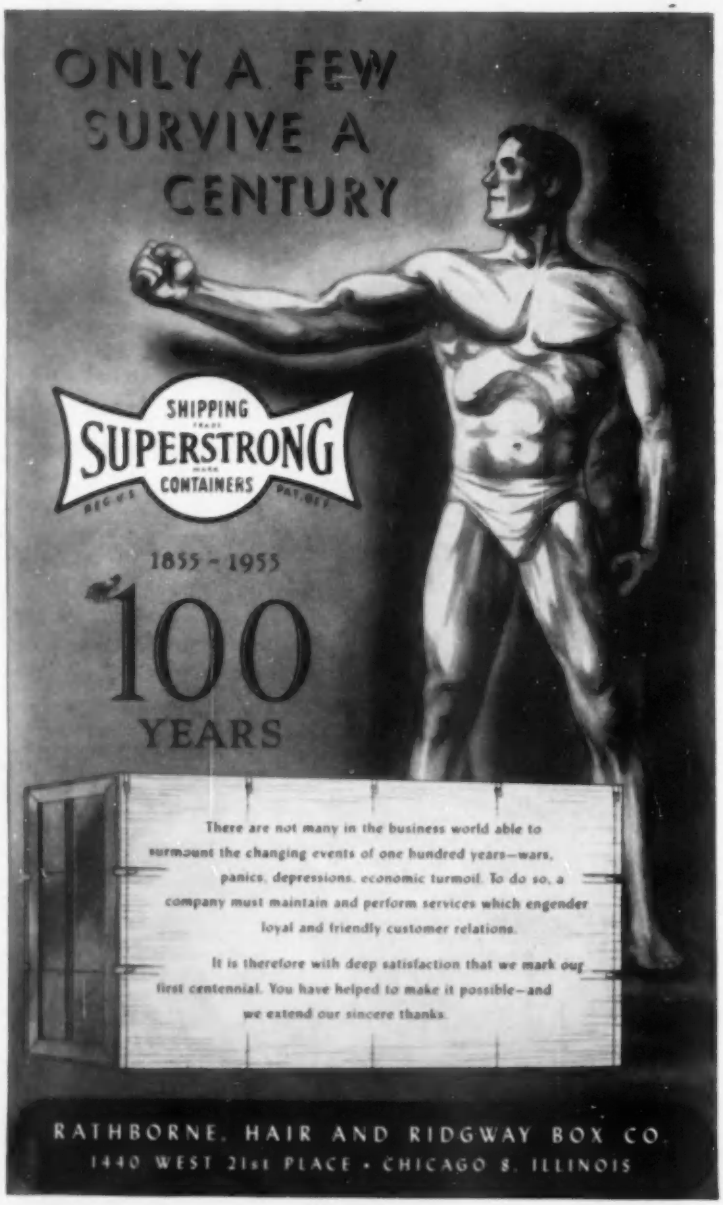
(Continued from page 240)

Magnaflux Corp.,
Chicago, Ill. (820)

Marathon Electric Manufacturing Co.,
Wausau, Wis. (509)

Marlin-Rockwell Corp.,
Jamestown, N. Y. (536)

Marvel Engineering Co.,
Chicago 6, Ill. (809)


ONLY A FEW SURVIVE A CENTURY
SHIPPING
SUPERSTRONG
CONTAINERS
1855 - 1955
100
YEARS
There are not many in the business world able to surmount the changing events of one hundred years—wars, panics, depressions, economic turmoil. To do so, a company must maintain and perform services which engender loyal and friendly customer relations.
It is therefore with deep satisfaction that we mark our first centennial. You have helped to make it possible—and we extend our sincere thanks.
RATHBORNE, HAIR AND RIDGWAY BOX CO.
1440 WEST 21st PLACE • CHICAGO 8, ILLINOIS

The Master Electric Co.,
Dayton 1, Ohio (123, 124)

May-Fran Engineering, Inc.
Cleveland 12, Ohio (449)

Meland Mfg. Corp.,
New York 5, N. Y.

Merkle-Korff Gear Co.,
Chicago, Ill. (841, 844)

Micrometrical Manufacturing Co.,
Ann Arbor, Mich. (651)

Micro-Poise Engineering & Sales Co.,
Detroit 27, Mich. (114)

Midwestern Instruments,
Tulsa, Okla. (140)

Miller Fluid Power Co.,
Melrose Park, Ill. (819, 821, 822, 823)

Morse Chain Co.,
Ithaca, N. Y. (348)

National Diamond Laboratory,
New York 38, N. Y. (551)

National Pneumatic Company, Inc.,
Boston 19, Mass. (439)

Nelson Stud Welding Div.,
Gregory Industries, Inc.,
Lorain, Ohio (454)

New Departure Div.,
General Motors Corp.,
Bristol, Conn. (537)

New Hermes Engraving Co.,
New York 3, N. Y. (430)

New Standard Div.,
U. S. Expansion Bolt Co.,
York, Pa. (813)

The New York Air Brake Co.,
New York, N. Y. (514)

New York Belting and Packing Co.,
New York 20, N. Y. (556)

Nilsson Gage Co., Inc.,
Poughkeepsie, N. Y. (366)

The Noble & Westbrook Mfg. Co.,
East Hartford 8, Conn.

Northwestern Tool & Engineering Co.,
Dayton 3, Ohio (847)

Oakite Products, Inc.,
New York 6, N. Y. (652)

Ohio Metal Products Co.,
Dayton, Ohio (128)

O'Neil-Irwin Mfg. Co.,
Lake City, Minn. (125, 126)

Optical Gaging Products, Inc.,
Rochester 11, N. Y. (412)

The Osborn Mfg. Co.,
Cleveland 14, Ohio (856)

Parker Appliance Co.,
Cleveland 12, Ohio (415)

Pines Engineering Co., Inc.,
Aurora, Ill.

Potter & Brumfield Mfg. Co., Inc.,
Princeton, Ind. (641)

Purolator Products, Inc.,
Rahway, N. J. (161)

Reeco, Inc.,
Deerfield, Mich. (672)

Robinson Aviation, Inc.,
Teterboro, N. J. (827)

J. A. Richards Co.,
Kalamazoo 60 F, Mich.

Roller Bearing Co. of America,
Trenton 3, N. J. (829)

Rowe Machinery & Mfg. Co., Inc.,
Dallas, Tex.

The S-P Mfg. Corp.,
Cleveland 6, Ohio (115)

Safety Socket Screw Co.,
Chicago 31, Ill. (824)

Saginaw Steering Gear Div.,
General Motors Corp.,
Saginaw, Mich. (348)

Schauer Manufacturing Corp.,
Cincinnati 36, Ohio (245)

George Scherr Optical Tools, Inc.,
New York 12, N. Y. (864)

Scully-Jones & Co.,
Chicago 8, Ill. (164)

Shell Oil Co.,
New York 20, N. Y. (154)

The Skinner Chuck Co.,
New Britain, Conn. (508)

(Turn to page 258, please)

IN POWDER METALLURGY . . . IT'S AMPLEX

The Bearing That Wouldn't Wear Out

125 years service without adding a drop of oil*

How long will a bearing last? An OILITE customer making large vertical shaft attic fans wanted to know the answer. He subjected a fan equipped with an OILITE bronze flange bearing to an *accelerated life test equivalent to 125 years of service. Throughout the test it ran quietly and smoothly. *Not one drop of oil was added—it showed no apparent wear.*

OILITE bearings hold oil by capillary attraction. Oil film on the surface insures positive, constant lubrication. Particularly good in trouble areas where lubrication is difficult or impossible. The built-in oil cushion allows OILITE Heavy-Duty Bearings to absorb shocks and stresses.

Heavy-Duty, self-lubricating OILITE bearings are Chrysler engineered to meet individual requirements. Standard bearings are available from local dealer stocks. Also cores, bars, plates, discs and strips in sizes ranging from ½" to 15¼" I.D. and 1" to 18¼" O.D.

The engineering facilities of Amplex and Chrysler, unmatched in the powder metal industry, are ready to help you with your bearing problems. For on-the-spot service, consult your telephone yellow pages for the field engineer near you.

CHRYSLER AMPLEX PRODUCTS

OILITE Bearings
Permanent Metal Filters
Finished Machine Parts
Friction Units

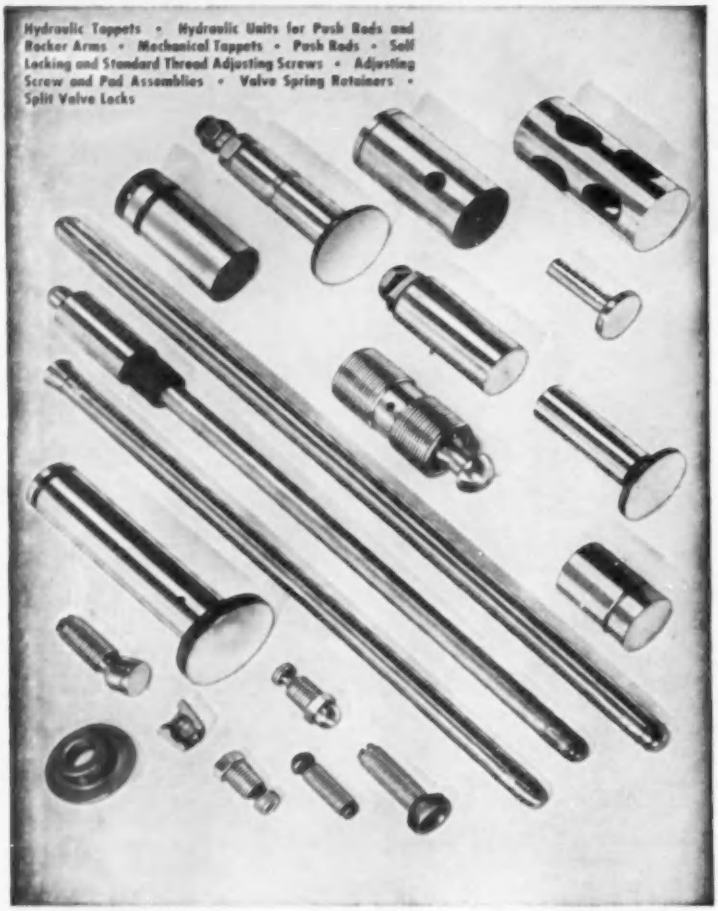
Write for free 24-page OILITE Bronze Precision Bearings bulletin S-53.

OILITE — *Only Chrysler makes OILITE*

CHRYSLER CORPORATION · AMPLEX DIVISION
Dept. J-8
Detroit 31, Michigan

"CHICAGO"
precision valve gear parts

•STEEL •CAST IRON •STEEL and IRON



Hydraulic Tappets • Hydraulic Units for Push Rods and Rocker Arms • Mechanical Tappets • Push Rods • Self Locking and Standard Thread Adjusting Screws • Adjusting Screw and Pad Assemblies • Valve Spring Retainers • Split Valve Locks

Connecting Rod Bolts.....Hydraulic Cylinder Pistons
Cylinder Head Studs.....Cylinder Head Cap Screws
Main Bearing Studs.....Main Bearing Cap Screws
Flywheel to Crankshaft Screws.....Diesel Energy Cells
Wheel Bolts and Studs.....Differential Carrier Screws
Oil Pump to Distributor Shafts.....Rocker Arm Shafts
Automatic Transmission Valves.....Water Pump Shafts
Roller Followers.....Ball Joint Assemblies

External and Internal Grinding, Thread Grinding, Precision Roll Threading

Heat Treating • Carbon Restoration • Carburizing • Carbo Nitriding • Cyaniding • Hydrogen Brazing • Complete Metallurgical, Dynamometer and Testing Laboratories

Special Screw Machine Parts 1/16" to 5" Diameter • Cold Upset 3/16" to 1" Diameter • Cap Screws • Set Screws • Nuts • Studs • Taper Pins • Socket Screw Products

***The* CHICAGO SCREW COMPANY**
2801 WASHINGTON BLVD.
BELLWOOD, ILLINOIS
Established 1872

Exhibitors at ENGINEERING SHOW

(*Continued from page 256*)

Speed Control Div.,
Fairchild Engine and Airplane Corp.,
St. Augustine, Fla. (744)

Sperry Products, Inc.,
Danbury, Conn. (451)

Spiral Step Tool Co.,
Chicago, Ill. (772)

Square D Co.,
Milwaukee 12, Wis. (404, 405)

Stackbin Corp.,
Pawtucket, R. I. (148)

Standard Oil Co. (Indiana),
Chicago 80, Ill. (464)

Standard Pressed Steel Co.,
Jenkintown, Pa. (828)

The L. S. Starrett Co.,
Athol, Mass. (144, 145)

Supreme Products, Inc.,
Chicago 16, Ill. (242)

Swivelier Co., Inc.,
Brooklyn, New York (351)

Synthane Corp.,
Oaks, Pa. (142)

Syntron Co.,
Homer City, Pa. (554)

Tapmatic Corp.,
Costa Mesa, Calif. (645)

Teer, Wickwire, Inc.,
Jackson, Mich. (546)

G. H. Tennant Co.,
Minneapolis 11, Minn. (520, 521)

The Timken Roller Bearing Co.,
Canton 6, Ohio (425, 426)

Toledo Scale Co.,
Toledo 1, Ohio (524)

Torit Mfg. Co.,
St. Paul 2, Minn. (646)

Trabon Engineering Corp.,
Cleveland 3, Ohio (422)

The Tumpane Co., Inc.,
Park Ridge, Ill. (409)

Twin Disc Clutch Co.,
Racine, Wis.

Union Manufacturing Co.,
New Britain, Conn. (159)

U. S. Electrical Motors, Inc.,
Los Angeles 54, Calif. (815, 816)

U. S. Rubber Co.,
New York 20, N. Y. (102)

Valvair Corp.,
Akron 11, Ohio (855)

Vapor Blast Mfg. Co.,
Milwaukee 15, Wis. (469)

Vascoloy-Ramet Corp.,
Waukegan, Ill.

Veeder-Root, Inc.,
Hartford 2, Conn. (240)

Vickers Electric Div.,
Vickers, Inc.,
St. Louis, Mo. (544)

E. F. Vilter Sales, Inc.,
Milwaukee 12, Wis. (456)

Visual Plant Layouts, Inc.,
Oakmont (Alleg. Co.), Pa. (812)

Wagner Electric Corp.
St. Louis 14, Mo. (129)

Warner Electric Brake & Clutch Co.,
Beloit, Wis. (152)

Jervis B. Webb Co.,
Detroit 4, Mich. (518)

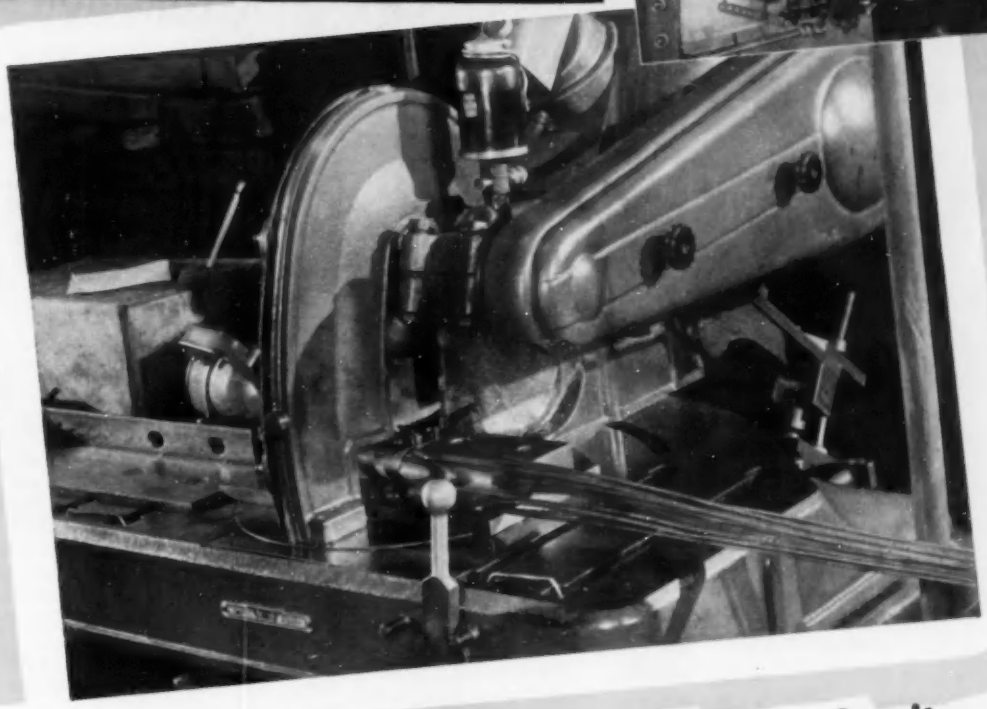
West Point Manufacturing Co.,
Detroit 19, Mich. (266)

Westinghouse Air Brake Co.,
Wilmerding, Pa. (149)

Westinghouse Electric Corp.,
Pittsburgh 30, Pa. (401, 403)

Wilson Mechanical Instrument Div.,
American Chain & Cable Co., Inc.,
Bridgeport 2, Conn. (116)

Standard Cut-off Saws Made Automatic with Inexpensive Air Motors*



Not only is production over manually operated units frequently doubled, but saw life is measurably increased and quality of cut markedly improved.

TAKE VIRTUALLY ANY MAKE of cut-off saw. Add a Bellows Air Motor with Hydro-Check control to feed the saw through the work — a second Bellows Air Motor, electrically interlocked with the first, to feed the work to position, and one or more interlocked Air Motors to hold the work . . . and you have a fully automatic, high production machine.

The installation can be made quickly in your own shop from detailed prints we will furnish. And the chances are excellent the total cost will be recovered with the first few weeks of added production.

Conversion of cut-off saws to automatic operation is but one of many ways you can use Bellows "Controlled-Air-Power" to obtain faster production at lower cost. Any hand operated machine tool, such as drill presses, milling machines, grinders, etc., can be made automatic with Bellows equipment, quickly and inexpensively.

*The Air Cylinder with the *built-in valve.*

1225A

Let us send you without cost—

Detailed prints of various ways Bellows Air Motors can be used to convert cut-off saws to automatic units, together with photos of typical installations.

Address: The Bellows Co.
Dept. AI955, Akron 9, Ohio.

The Bellows Co.

Akron 9, Ohio

In Canada: Bellows Pneumatic Devices of Canada, Ltd., Toronto, Ont.

THOMSON

NYLINED*

BEARINGS

...with Smooth, Tough, DuPont NYLON!

...OFFER YOU THESE IMPORTANT BENEFITS

- LOWER COST
- NO LUBRICATION
- MINIMUM SPACE
- CLOSE FIT
- RESIST POUNDOUT
- RESIST ABRASION
- RESIST CORROSION
- EASILY INSTALLED
- DAMP VIBRATION
- OPERATE IN LIQUIDS
- NO FRICTION OXIDATION
- LOW FRICTION
- SILENT
- LIGHTEST WEIGHT
- NON-CONTAMINATING
- LESS MAINTENANCE
- SELF-RETAINING
- INSTANTLY REPLACEABLE
- LONGER LIFE

Engineered to Solve Problems... Improve Products... Reduce Costs!

NYLINED Bearings are a highly engineered thin liner of Dupont Nylon, designed to bring bearing users the many benefits of Nylon as a bearing material by solving most of the limitations surrounding its use. The compensation gap principle assures maintenance of diametral tolerances for precision applications.

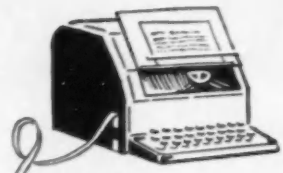
Available in 4 standard types, 10 standard sizes... from stock. Other types and sizes may be inexpensively tooled for production applications. For catalog containing data on advantages, applications, standard sizes, prices, special types, load ratings, engineering information, evaluation chart, installation methods ...write to

*REG U. S. PAT. OFF.

THOMSON INDUSTRIES, Inc.

DEPT. 1, MANHASSET, NEW YORK

Also— Manufacturers of BALL BUSHINGS... the Ball Bearing for Linear Motions



ON OUR WASHINGTON WIRE

Use of fast tax amortization to induce industry to expand productive facilities as a hedge against another emergency will be curtailed in the weeks ahead. Changes on an overall basis, however, won't be too sweeping.

The nation's highway users paid a record $3,339,899,000 in state highway use taxes last year, according to tables recently released by Bureau of Public Roads. Motor fuel taxes accounted for $2,305,759,000; motor vehicle taxes, $1,251,313,000; and motor carrier taxes, $82,827,000.

Installment credit, paced by automobile loans, soared by $765 million in June to push installment debt to a record $24.9 billion. Total consumer debt of all kinds rose by $903 million to $32.4 billion.

Congress, in an effort to bolster the depressed American motorcycle industry, has removed the 10 per cent excise tax on the vehicles.

Defense Production Act, basic law giving Government authority to stockpile and allocate materials, is extended for another year. The Administration had asked for a two year extension.

Service tests of six turboprop transport planes are to be started soon by the Military Air Transport Service. Results will be passed along to U. S. commercial airlines.

The first atomic-powered airplane is said to be close at hand. Since there are many minor wrinkles still to be ironed out, Atomic Energy Commission is reportedly holding up the official announcement of the atomic plane's birth. It is stated that aircraft engineers and atomic experts have finally solved the problem of excess weight.

CASE HISTORIES IN LEADING AUTOMOTIVE PLANT
prove advantages of
NORGREN MICRO-FOG LUBRICATION

for complete machine tools . . . for tool lubrication on machining jobs.

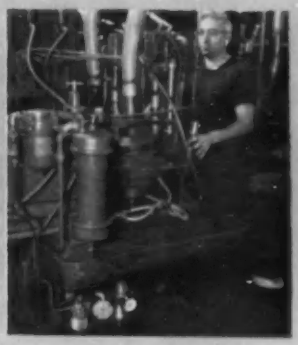
Only a year ago, a leading manufacturer of automotive electrical equipment tried Norgren Micro-Fog lubrication on one production machine. Based on the excellent results obtained, these machines and others were rapidly converted to Micro-Fog lubrication. Here are a few of the Micro-Fog case histories with the results:

More Efficient and Economical

9/16" multiple spindle automatic screw machine. Micro-Fog lubricates every point in operating mechanism requiring lubrication—replacing a pump recirculating system. Results: more efficient and economical lubrication using only 8 drops of oil per minute; entire mechanism in large gear case operates in oil fog, resulting in more thorough lubrication.

$13,000 Saving Per Year on One Machine

Tapping machine chasing threads on zinc, die-casting. Micro-Fog lubricates chasers—replacing a pump recirculating system. Results: eliminated degreasing of parts, saving an estimated $13,000 per year; tool life increased 300%; substantial saving in lubricant.

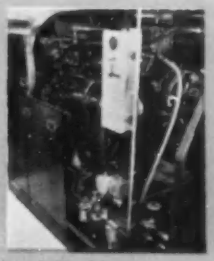


Reduced Number of Rejects

Mill and power heads of this milling machine were formerly packed in grease. Machine ran so hot that guide rods expanded, causing inaccuracies in milling. Micro-Fog eliminated this heating problem; milling accuracy was greatly improved; number of rejects substantially reduced.

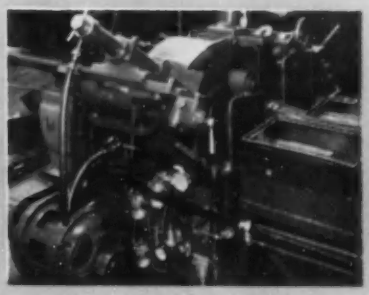
Tap Life increased 300%

Tapping machine. Micro-Fog lubricates 6 taps—replacing a pump recirculating system. Results: tap breakage reduced to a minimum; tap life increased 300%; working conditions greatly improved, resulting in more efficient operation; substantial saving in lubricant.



Reduced Machine Maintenance

3000 rpm automatic screw machine. Micro-Fog lubricates sleeve and anti-friction bearings, slide blocks, chucking mechanism and gears—replacing a pump circulating system. Results: increased life of bronze slide blocks and other parts; ½ pt. oil per day does better lubrication job than 15 gal. did previously; less machine maintenance.



Centerless Grinder completely lubricated with only 12 drops of oil per minute

Micro-Fog lubricates drive bearings, thrust bearings on wheel spindle, journal bearings, gear change box, journal and thrust bearings on back-up wheel, two sets of ways, using only 12 drops of oil per minute. Replaced a pump recirculating system. A unique system of chevron grooving in drive shaft bearing aids in Micro-Fog distribution.

C. A. Norgren CO.
3451 So. Elati, Englewood, Colo.

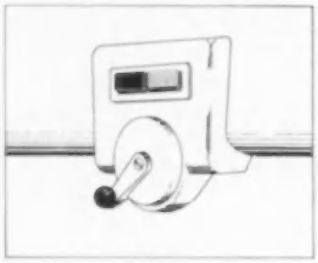
For complete data write for Norgren Blueprints MF 12 thru MF 17.

PIONEER AND LEADER IN OIL-FOG LUBRICATION FOR 27 YEARS

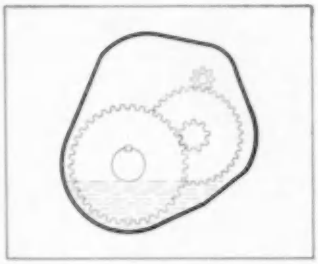
2 New CINCINNATI PRESS BRAKES

THIRTY TON - - - - 2-30 SERIES
FIFTY TON - - - - 3-50 SERIES

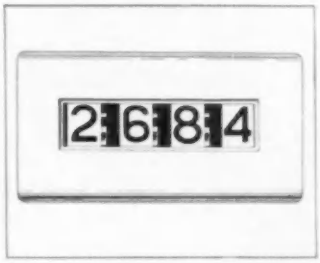
COMPETITIVELY PRICED



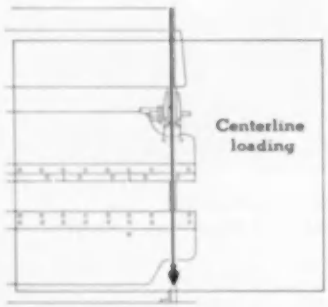
Front controlled, variable speed drive, 20 to 50 strokes per minute.



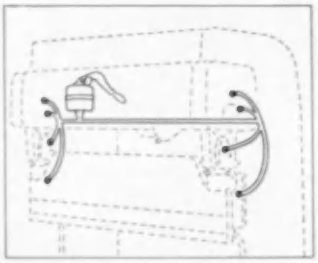
Completely enclosed transmission, running in oil.



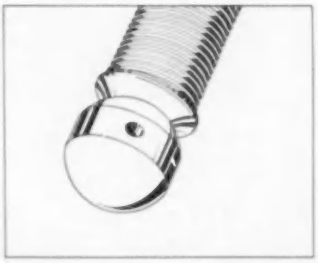
Two micrometer indicators, one at each end of the ram—easy to read and accurately record the amount of adjustment and tilt.



Centerline loading prevents weaving of the housings and insures accurate bends.



Centralized pressure lubrication system.



Ball end on the ram adjusting screws permits tapering of the ram for fade-out work.

THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A. SHAPERS • SHEARS • BRAKES

2-30 SERIES

This new 2-30 Series Cincinnati All Steel Press Brake has a capacity of 14 gauge x 6′ mild steel.

Look at these unusual standard features:

2½″ stroke—12″ shut height—9″ throat.

Distance between housings 5′-2″—overall die surface, 6′-0″.

Front controlled, variable speed drive, 20 to 50 SPM. 4″ manual ram adjustment including ram tapering adjustment for fade-out work (power adjustment available as extra feature).

Bronze swivel end-guide bearing for accurate endwise alignment, even when tilting ram.

Brushless electro-magnetic brake and clutch.

Deep bed and ram, planed and drilled for 5¾″ angles.

Micrometer indicators on both ends of ram for fast, accurate setting.

3-50 SERIES

These new 3-50 Series Cincinnati All Steel Press Brakes are built in two lengths and have a capacity of 10 gauge x 6′ mild steel. Investigate these unusual standard features: 3″ stroke—12″ shut height—12″ throat—distance between housings 6′-6″ or 10′-6″—overall die surface 8′-0″ or 12′-0″—front controlled, variable speed drive, 20 to 50 SPM.

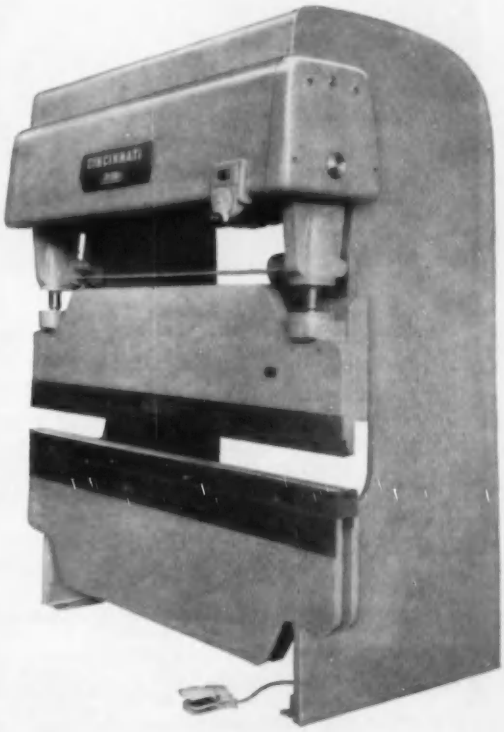
5″ motorized ram adjustment, including ram motor and control, complete with ram tapering adjustment for fade-out work.

Bronze swivel end-guide bearing for accurate endwise alignment, even when tilting ram.

Brushless electro-magnetic brake and clutch.

Deep bed and ram, planed and drilled for 5¾″ angles.

Micrometer indicators on both ends of ram for fast, accurate setting.



Modern Machine Productivity

(*Continued from page 89*)

machines to produce 20 truck axle housing per hour. These machines had a total cost of $395,000 at that time—$754,450 now—and required a labor force of five men per shift. A relatively recent installation of one machine, sold at a cost of $320,000, does the same job as the previous seven units. This new machine requires only two men per shift. Once again, here is a startling example of substantial cost savings with new mastantial cost savings with new machinery. It also must be remembered that with the new equipment, the quality of the product has been bettered. Of course, machine units have been made more dependable; and we have better materials and cutting tools. These things have lessened machine downtime, thereby providing other savings and increasing overall productivity. It is also interesting to note that the one machine which manufactures the 20 axle housings per hour is currently operating at less than 60 per cent of capacity.

According to the *Twentieth Century Fund*, American productivity is increasing so rapidly that if present rates continue, in another 100 years we shall be able to produce as much in one seven-hour day as we now produce in a 40-hour week.

Our Military Requirements

The military believes that there is sufficient machine tool capacity for current military production requirements. One of the exceptions, perhaps, exist in such cases as the so-called elephant type long lead time machine tools. Of course the problem here deals with design and the size complexity of the product. As has been brought out previously in this column, the Government has approved a $100 million machine tool buying program for the fiscal year of 1956. Thomas P. Pike, assistant secretary of Defense, (supply and logistics) tells us that this figure can be revised upward.

To prevent a critical shortage of tools in the event of an emergency, the Department of Defense is working closely with other Government agencies in preparing national policy that would assist the machine tool industry in building up its capacity. These policies include such items as pool order contracts, assisting industry to obtain sufficient man power, and helping machine tool buyers to get the materiel which they require. The various military services are also engaged in making up estimated machine tool requirements. According to Mr. Pike, the Department of Defense is also actively engaged in the reserve tools and facilities program, which includes the procurement of tools for mobilization use and at the same time assists the machine tool industry to remain in a healthy operating condition.

Concerning the machine tool reserve, it is reported, based on a 65 per cent completed inventory, that there are 300,000 items costing almost $3 billion in reserve. There are also 50,000 tools in storage which had an original cost of some $500 million.

Of the production equipment items owned by the Department of Defense, 55 per cent are in use on defense contracts. Less than 0.5 per cent of the

it's the finish that counts!

Roto-Finish maintains exact tolerances on precision parts with no significant dimensional changes. It makes possible a wide range of finishes applicable to parts of almost any size or shape; finishes a variety of materials — at big savings in manpower and costs. Without obligation, send sample unfinished parts to us. Include finished part for guide and your specifications. Roto-Finish will finish parts in its laboratory. You get a complete process report. You are guaranteed results and a finish that counts!

WRITE FOR FACT-PACKED ROTO-FINISH CATALOG NOW

Roto-Finish COMPANY

3713 Milham Road, Kalamazoo, Michigan
Originators of the Roto-Finish Process

P. O. Box 988
Phone 3-5378

production equipment owned by the military has been listed for non-military production. There is expected to be a slight increase in this percentage. Also concerning the reserve program, it is interesting to note that the Government plans to buy less than three per cent of the tools from foreign sources.

For the efficient distribution and activation of reserve machine tools when necessary, the Department of Defense has required that an inventory be made that will give information as to the characteristics of the equipment, the year of manufacture, the name of the manufacturer, the electrical characteristics, its location and condition, and an indication of the operability of the machine.

Equipment, Expenditure, Expectations

Recently in Washington, Representative Richard Bolling (D., Mo.) chairman of the subcommittee on economic statistics of the joint committee on economic report, called a meeting to hear from the business plant and equipment, expenditure, expectations task force set up by the Board of Governors of the Federal Reserve System. This task force is headed by George Terborgh, research director of Machinery and Allied Products Institute. There were several interesting recommendations made by the group on what statistics should be developed in respect to equipment purchases, as well as plant and equipment expenditures. Under the former, it was recommended that a new monthly statistical series should be developed on orders, shipments and unfilled orders for capital equipment. Secondly, the desirability should be explored of compiling quarterly forecast of new business by capital equipment producers. Also deserving of exploration are the possible advantages and feasibility of a series on new authorizations for capital commitment. In the plant and equipment category, there were seven recommendations made by the task group to the congressional subcommittee. The first of these was that ample coverage of data on plant and equipment expectation should be expanded to fill in the more significant gaps, and the desirability of modifying blow-up procedures should be investigated. Secondly, detailed tests should be carried out periodically to check the predective accuracy of the data. Another recommendation was the further study of the longer term capital programs.

YOU ASSURE...

✓ Greater Economy
✓ Better Performance
✓ Longer Service-Life

WITH

JOHN CRANE

TYPE 11-A

Water Pump

SEALS

BECAUSE:

1. **You save on production time.** The Type 11-A Seal is a low cost, compact, factory assembled unit. Its "pressed-in" cartridge-type construction makes for quick installation as equipment rolls by.
2. **One seal size fits several shaft diameters.** Retainer is so constructed that it does not contact the shaft, eliminating the need to "switch" seals when shaft specifications vary slightly.
3. **Damaging stresses are eliminated.** Since the entire unit remains stationary, the seal readily lends itself to applications involving high speed and vibration.
4. **Safeguarded against corrosion.** Metal spring utilized to maintain constant contact of sealing faces is fully enclosed in synthetic rubber bellows. This eliminates the need for costly corrosion-resistant spring materials.

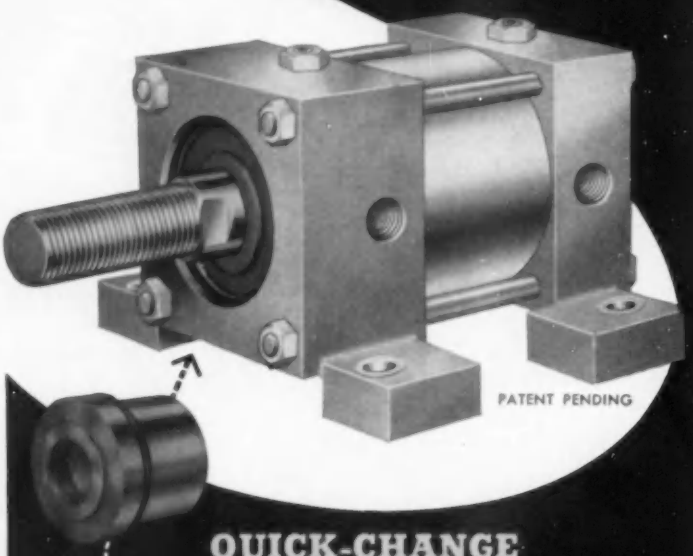
"John Crane" Type 11-A Seals are recommended for temperatures to 212°F., pressures to 50 psi. Available in four stock sizes from ⅛" to ¾".

Contact "John Crane" engineers on your requirements today. Request illustrated catalog on complete line of seals for all services.

Crane Packing Co., 1835 Cuyler Avenue, Chicago 13, Illinois.
In Canada: Crane Packing Co., Ltd., 617 Parkdale Ave., N. Hamilton, Ont.

JOHN CRANE CRANE PACKING COMPANY 38 YEARS INDUSTRIAL PROGRESS

*APPROVED HEAVY-DUTY AIR CYLINDERS for Automation



QUICK-CHANGE PACKING CARTRIDGE Cuts Downtime

Step up production with rugged, service-free, S-P Heavy-Duty Air Cylinders:

- Designed for 200 PSI
- Rolled steel end plates
- Extra long cushions
- Extra large, hardened piston rod
- Minimum mounting and envelope dimensions
- 5 types of mountings
- 8 bore sizes, 1½" to 6"
- Double porting
- Interchangeable check and cushion valves
- Quick-change packing and bearing cartridge

* S-P Automation Cylinders were designed expressly for a large automobile manufacturer. They are thoroughly proven for automation and general heavy-duty applications. Prompt deliveries. Send for Catalog 109. For S-P standard Air Cylinders, request Catalog 102. The S-P Manufacturing Corp., 12415 Euclid Ave., Cleveland 6, Ohio.

THE S-P MFG. CORP. — Cleveland
A Bassett Company
PRECISION PRODUCTS SINCE 1916
AIR AND HYDRAULIC CYLINDERS • POWER CHUCKS • ROTATING AIR CYLINDERS
COLLET AND DRILL PRESS CHUCKS • AIR PISTONS, VALVES AND ACCESSORIES

1956 Lincoln

(*Continued from page 237*)

marked increase in engine torque. According to Lincoln engineers, the new hydraulic control provides smoother band and clutch engagement. It gives a smoother kickdown above 45 mph and gives improved intermediate to low gear engagement in down-hill braking.

The new In-Line power steering system provides for power steering with a minimum of pre-load. It is compactly designed with the steering shaft, worm and ball nut, power piston and rack, and the power cylinder all in line. The valve is mounted on the top side of the gear housing which allows for internal oil passages between the valve and the cylinder, thus eliminating all external lines and hoses except the pressure and return hose between the pump and the valve. The steering column is now mounted on the toe board.

The mechanical element of this steering is of the low friction recirculating ball-type. The ball nut is assembled as a rigid part of the piston and rack which is geared to the sector on the pitman shaft.

The steering linkage is the parallelogram system. Spring loaded cross links run from the pitman arm to a similar idler at the right. Symmetrical steering rods connects the cross link to the steering arm. Power steering is standard on all models.

For the new models, the propeller shaft has been relocated so that it goes over the lower frame x-member rather than through it.

Accelerator linkage is now suspended with the rod going through the firewall.

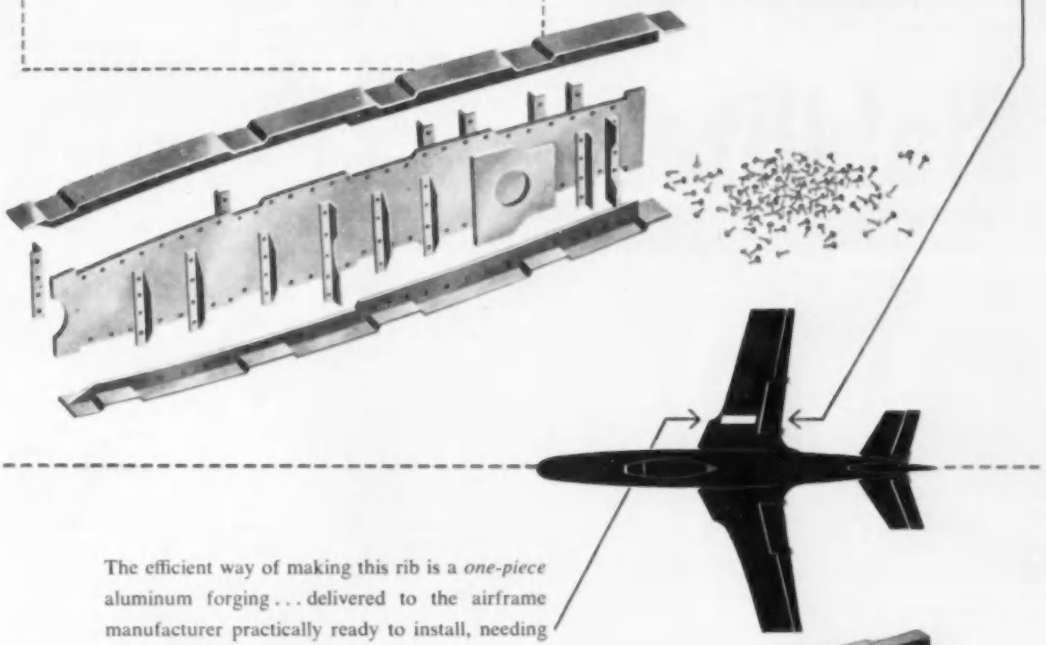
The fresh air ventilating system duct size has been increased by 50 per cent. Air is still taken from behind the front grille.

BOOKS . . .

A COMPANY GUIDE TO THE SELECTION OF SALESMEN, *by Milton M. Mandell, published by the American Management Association, 330 West 42rd St., New York, N. Y.* This practical report discusses and analyzes the current practices of 180 manufacturing firms of diverse interests to demonstrate how they operate in the selection of their sales forces, the reduction of sales staff turnover, and the improvement of sales performance. All types of selection devices are dealt with in detail: application blanks, interviews, tests, reference inquiries, etc., and there are over 50 pages of facsimile reproductions of actual forms.

Harvey forgings... changing assembly-hours into flying hours

Time is a vital element in building America's air defenses. This wing rib takes dozens of man-hours to assemble, because it includes 22 separate parts, 291 rivets. Every hour spent in such fabrication is one less hour available for final assembly.



The efficient way of making this rib is a *one-piece* aluminum forging... delivered to the airframe manufacturer practically ready to install, needing only drilling and machining. And it's a stronger, lighter, better part, in the bargain.

MAKING THE MOST OF ALUMINUM . . . FOR EVERYONE

RESEARCH . . . DEVELOPMENT . . . PRODUCTION

Harvey does all three as a leading independent producer of aluminum extrusions in all alloys and all sizes, special extrusions, press forgings, hollow sections, structurals, rod and bar, forging stock, pipe, tubes, impact extrusions, aluminum screw machine products and related products. Also similar products in alloy steel and titanium on application.

HARVEY Aluminum

HARVEY ALUMINUM SALES, INC., TORRANCE, CALIFORNIA—BRANCH OFFICES IN PRINCIPAL CITIES

AUTOMATION NEWS REPORT

(*Continued from page* 91)

To provide positioning control, the machine director angularly positions the rotors of the command selsyns in accordance with the punched card information. Each command selsyn is electrically tied to a position-sensing selsyn which is geared directly to a controlled machine member. The rotor voltage of the command selsyns is proportional to the angular positioning error between the two electrically-tied selsyns. Thus, correct positioning is accomplished by moving the machine member until this positioning error is zero. As soon as all members have reached the correct position, the machining operation is performed.

The d-c feed drives on the machine, directed by the selsyns, run at a preset top speed — then smoothly and automatically slow down to a speed proportional to the distance from the desired position as it is approached.

As the first card is read, the machine positions itself accordingly, and the machining operation takes place. While this is taking place, the next card is read and the machine moves to its next position.

At the same time the machine is being positioned by the control, machine directions are also being read from the punched cards. These directions are conveyed to the machine in coordination with the positioning movements. Normally, the machining operation would take place immediately after the machine reaches the correct position — while the next card is being read. In some applications machining occurs during the positioning motion. If desired, the machine action may also take place before the positioning occurs.

Flexibility of Numerical Positional Control allows speed, accuracy and length of motion to be individually selected for each application. Normally the length of motion will not exceed 450 in. However, nearly unlimited motion lengths can be attained should the application demand it. NPC offers speeds up to 500 ipm and accuracies up to plus or minus 0.0005 in., depending upon speed.

CONGRESS LISTENS

Hearings are scheduled before the Subcommittee on Economic Stabilization of the Joint Committee on the Economic Report, about "automation." Among those invited to meet in public hearings during October are Henry Ford II, Ford Motor Co., and Paul G. Hoffman, Studebaker-Packard Corp.

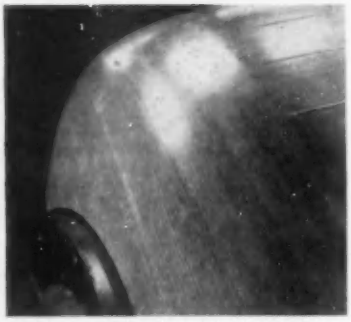
BRAIN FOR BUICK

An electronic "brain" which will be used in preparing purchasing and production schedules on new-car orders from dealers is being installed by Buick at its Flint plant. Called the IBM 650 magnetic drum computer, the machine will be used chiefly for estimating material needs and preparing production schedules for its eight different assembly lines. One of its first jobs will be to figure the number of color, trim and accessory variations available on Buick cars.

Stabilite ...IT "STAYS PUT"

NEW-dimensionally stable wood for die models and patterns

Model made of conventional mahogany. Swelling and movement of wood render it unusable as a die model.



Model made of *Stabilite* retains its smooth, even finish and dimensions necessary for an accurate die.

Tests made by Forest Products Laboratory

NOW—for the first time—die models and patterns made of wood can be dimensionally stable by using *Stabilite*—the only wood that "stays put".

Stabilite has everything you want—dimensional stability; resistance to heat, acids, fungi, insects and decay. You can produce extremely accurate die models, and patterns for stampings and castings by using *Stabilite*.

If you produce die models and patterns, it will pay you to fill in the coupon below and mail it TODAY.

Manufactured by
Nickey Brothers, Inc.
Memphis, Tennessee

Distributed by
Aetna Plywood & Veneer Co.
1726 N. Elston Avenue, Chicago 22, Ill.

Aetna Plywood & Veneer Co., Technical Sales Dept.,
1726 N. Elston Avenue, Chicago 22, Illinois

Please send us special descriptive folder on *Stabilite*—the only wood that "stays put".

Name .....

Company name .....

Street Address .....

City ..... Zone ..... State .....

AUTOMOTIVE INDUSTRIES . . .

is your News Magazine of Automotive and Aviation MANUFACTURING

Don't miss it!

a World's Fair of Power

THE GENERAL MOTORS POWERAMA

Lake Shore—South, Chicago · August 31 through September 25

Here's your chance to mix business with pleasure in a big way.

It's the General Motors Powerama created to celebrate the building of GM's 100,000,000th Diesel horsepower – staged at a fabulous wonderland on Chicago's Lake Front.

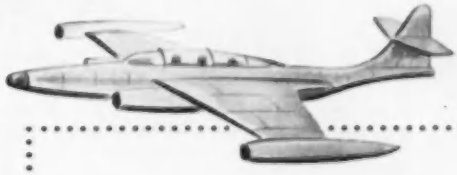
Here you'll see Allison TORQMATIC DRIVES smoothly transmitting Diesel engine power – see why these proved drives make any engine run better, more efficiently.

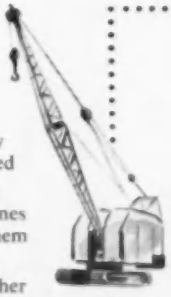
You'll see a wide range of TORQMATIC-equipped machines in action, watch them speed through their paces, see them change the face of the earth.

You'll watch TORQMATIC-equipped Army tanks and other military vehicles performing breath-taking maneuvers – see twin-jet Scorpions and a sensational VTO interceptor, both powered by Allison aircraft engines.

And here you'll see a brand-new idea in the world of entertainment—the first Technological Circus—"More Power to You"—an amazing combination of circus thrills—vehicular skills and big-time entertainment.

And best of all, *it's all free*. So bring the family – they'll enjoy it just as much as you.





POWERAMA FEATURES

- ★ *Stage show—music, dancers, fun for all*
- ★ *World's newest lightweight train*
- ★ *Diesel-powered boats, tractors, road-building machines*
- ★ *Oil-drilling rigs in action*
- ★ *Mammoth trucks*
- ★ *Scores of Diesel-powered units at work*

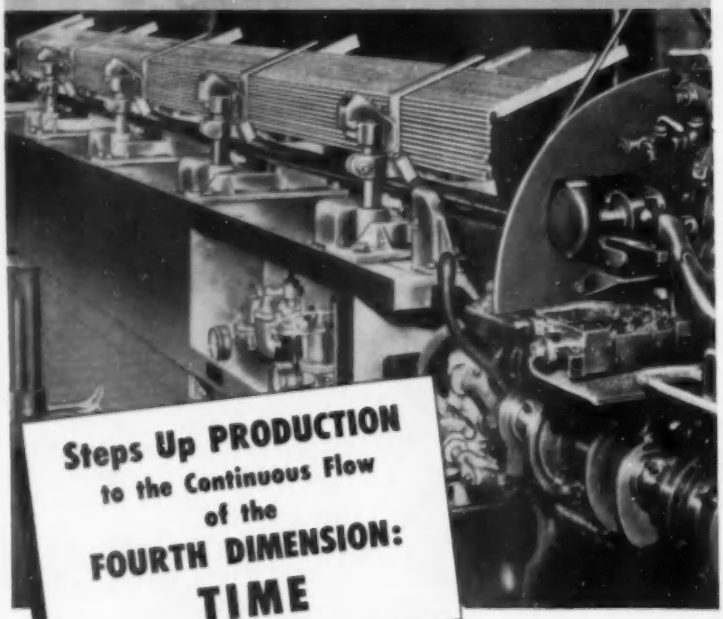
GM TORQMATIC

Allison

TORQMATIC DRIVES

Allison Division of General Motors, Indianapolis, Indiana

Now... A Screw-Machine-Feed that BREAKS THE TIME BARRIER!



Steps Up PRODUCTION to the Continuous Flow of the FOURTH DIMENSION: TIME

EVERY TIME a screw machine cuts air . . . every time feed fingers are adjusted or replaced . . . every time remnant removal forces a shut-down — *that's time lost forever, never again to be made up in the production quota!*

In the modern Lipe Automatic Magazine-Loading Bar Feed, we present a continuous-feed mechanism that utilizes *every minute* of the working day for production . . . and still more production.

There's *No* cutting air. *No* feed fingers. *No* remnant problem. *No* minimum or maximum run. *No* limit on length of feed. *No* selective stock length requirement.

There IS a definite increase in production — up to 100% on some installations — *at least* 30% on every one!

Send today for FREE BOOKLET giving full details on Lipe's AML Bar Feed — today's big advancement in screw machine stock feeding. We will also supply name of your nearest distributor.

Lipe-ROLLWAY CORPORATION
Manufacturers of Automotive Clutches and Machine Tools
Syracuse 1, N. Y.

METALS

(*Continued from page* 92)

Aluminum Price Increased

Effective August 1 the aluminum price was raised 1 cent per lb to 22.5 cents for pig and 1.2 cents per lb to 24.3 cents for ingot. The price increases followed the settlement with the CIO United Steel Workers in which wage rises amounted to about 15 cents per hour.

Aluminum remains in tight supply and the recent price increase appears to be moderate, although it is actually in exact ratio with the 5.8 per cent increase in the steel price which followed wage hikes of about the same hourly rate. Zinc producers breathe easier because of the higher aluminum price, as it reduces the fear of substitution by aluminum through price advantage in their cherished die-castings field.

More aluminum will shortly be available to industry. Anaconda's new 60,000-ton plant has started up in Montana. Reynolds has announced plans for a $230 million expansion, to increase its annual primary aluminum output by 135,000 tons. Additions to present plants to provide 35,000 tons of new capacity are scheduled for completion in 1956.

Copper Price Raised In London

Early in August the important Prain group in London which controls about half the copper output of Northern Rhodesia gave up its brave effort to hold the copper price at 35 cents per lb for British consumers and raised it to 40⅝ cents. This price will hold for 30 days, after which it will be subject to change on 24-hours notice.

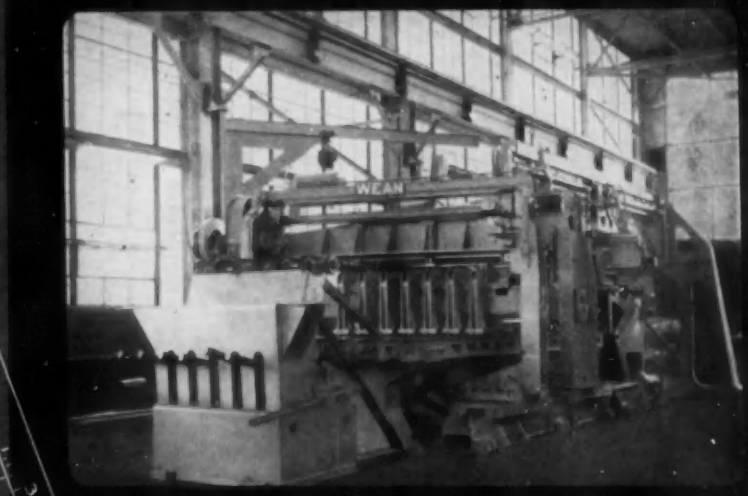
On the London Metal Exchange, copper has sold at 46 cents per lb. Thus the new Prain price is still substantially less than what is paid by users outside of Prain customers.

As a result of all this, U. S. copper producers who have been desperately trying to hold the domestic price to 36 cents per lb have lost one of their strongest bulwarks to support their position, and an advance to about the 40 cent level is now regarded as inevitable in the trade. The price situation by mid-August was rendered even more vulnerable by the long strike at the principal copper mines, mills and smelters. It is estimated these work stoppages have caused the loss of over 60,000 tons of copper

(*Turn to page* 274, *please*)

need an idea?

Wean Trapezoidal Shear Line Solves Problem for Auto Maker



The Wean Trapezoidal Shear Line was developed as an answer to the high speed blanking of irregularly shaped pieces in the broad range that can be described as trapezoids or parallelograms. This use reduces tremendously the cost of expensive die setup in major blanking presses. Two pieces are made at each index with the accuracy that can only be achieved by a measured length indexing system. The cut can range from 45° to 90° angles. The latter setting establishes the line as a straight cut-up unit with twice the normal production of conventional shear lines. At Wean, we consider this line as another important step forward in our policy of cost reduction through progressive engineering. People in the automotive and metal fabricating fields have come to look more and more toward Wean Equipment for spectacular advances in machinery for metal processing.

Wean

EQUIPMENT CORPORATION
CLEVELAND, OHIO

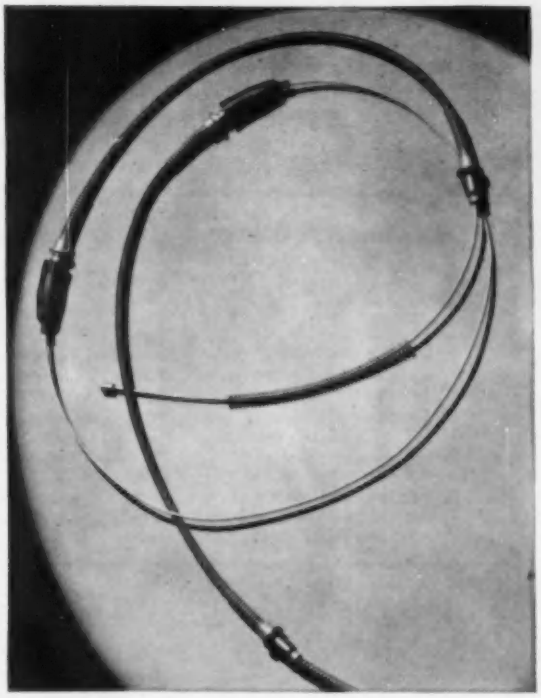
Offices:
CLEVELAND • DETROIT • CHICAGO • NEWARK, N.J.
Cable: WEANCOR

Can you guess what these American

A _____

Quality Springs are used for?

B _____ C _____



ANSWERS

A **CAR-PROOF.** You're looking at the wall of a striking new parking garage just erected in Chicago. American Steel & Wire furnished miles of stainless steel strand that runs continuously from the roof to the ground—where it is stretched tight by means of American Quality Springs. Appearance is breathtaking, and the novel construction prevents cars from rolling off the concrete slabs.

B **ONE LUNG GRAIN BIN.** When grain is stored, it *must* be adequately ventilated. American Steel & Wire produced thousands of these enormous steel "springs" that can withstand tremendous radial loads. In fact, they are laid on the floor of the bin, wrapped with AS&W Insect Screen, then covered with tons of wheat. Air can then be pumped through the tube, and the wheat stays dry and in good condition.

C **YOU USE IT ALMOST EVERY DAY.** It's not a terrifying medical instrument. Rather, this collection of cable, springs, clips and rubber boots is the entire parking brake assembly for a famous automobile. This entire unit was produced by American Steel & Wire.

●Remember, American Steel & Wire can supply *completely fabricated* wire and spring assemblies in quantity. Get in touch with your AS&W salesman . . . take advantage of American Steel & Wire quality—and *price*.

AMERICAN STEEL & WIRE DIVISION, UNITED STATES STEEL, GENERAL OFFICES: CLEVELAND, OHIO
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA., SOUTHERN DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS

USS AMERICAN QUALITY SPRINGS

UNITED STATES STEEL

(Continued from page 270)

since July 1 through August 7. Hardships on the copper fabricators has been pronounced. They were confronted with either closing down operations through inability to get their normal supplies, or to go out in the open market and bid as high as 50 cents per lb for enough metal to run on. The Copper & Brass Research Association estimated about 65 per cent of the industry would have to close its plants progressively, idling 22,000 men, if the mines did not resume.

Fabricators Base Prices On 40 Cent Copper

The fabricators lost no time in adjusting the prices of their consumer products to reflect actual or prospective increases in the copper price, or as Revere Copper & Brass announced "to partially reflect what the company is now paying for scrap and for such raw copper as it is able to get." Copper products have been increased by 4 cents per lb and yellow brass products by 3 cents per lb. In a general way, new prices are based on 40-42 cents per lb for copper which is expected to be the new level.

It will take months before copper is again flowing normally through trade channels. The real pinch may come later on as a 60-90 day lag usually ensues in processing the concentrates into electrolytic copper after mine production is resumed. Pipe lines must be filled and normal inventories rebuilt. Copper promises to be on the scarce list for the rest of this year.

Zinc Futures Advance

While zinc futures on the New York Commodity Exchange have been advancing spot zinc was unable to rise above 12½ cents per lb by mid-August. Demand was moderately active with most buyers in the diecasting field and galvanizers were busy. On the other hand, the long drawn out copper strike halted zinc purchases by the brass mills because of their inability to get copper. Brass mills normally use about ⅛ of the total zinc supply.

Zinc mines and smelters were unaffected by the copper strike and production continues at a very high figure. Nevertheless, shipments have kept ahead of production and resulted in continued declines of stocks which at the end of June stood at 48,612 tons, off 152,500 tons from a year earlier. Yet it is privately admitted by zinc men that the industry needs a new major consuming outlet for the ever increasing mine output.

Lead Output Cut by Strikes

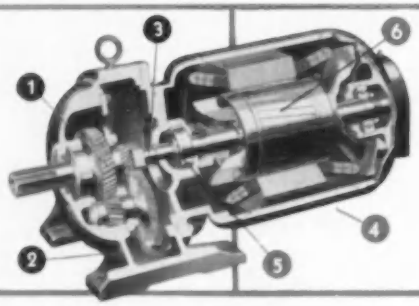
Unlike zinc, lead production was badly crippled by strikes in July. Consumers ran into some difficulties in obtaining their usual tonnages promptly. It is estimated about 30,000 tons of refined lead have been lost through strikes. Larger imports have relieved the situation to some extent.

The price remains firm at 15 cents per lb. There is less talk of higher prices in spite of strikes. Replacement battery shipments were higher for the first half of 1955 than in the corresponding period of 1954. It is also likely they represented a larger tonnage of lead because of heavy batteries needed for the new cars.

to AUTOMOTIVE ENGINEERS, Howell suggests

What to look for in Gearmotors

1. **Lifetime gearing.** The wear-resistance of gears depends, in good measure, upon their hardness. Howell's Duti-Rated Lifetime gears have a Rockwell hardness (52-60) substantially higher than the industry average.
2. **Compact, permanently aligned case.** Machine designers like the space-saving compactness of the Howell gear case. Pyramidal mounting puts support where it's needed — avoids the shaft misalignment possible when motor and gears have separate supports.
3. **Rugged, solid-shank pinion.** Howell's pinion design, with threaded coupling and self-broaching splines, makes a failure-proof shaft connection between motor and gears. No troublesome keys.



4. **NEMA-standard motors** give machine builders and users complete motor interchangeability, help them reduce inventories and simplify purchasing. Howell gearmotors give you this valuable feature — *with the new re-rated motors included!*
5. **Fully-protected bearings** insure longer motor life. Dirt can't enter Howell's double-shielded bearings either from inside or outside the motor, because they are sealed in the end-plate cavities by dust-tight inner caps.
6. **Copper-clad rotors** mean better heat conductivity, stability at high temperatures and, as opposed to die-cast rotors, greater design flexibility to meet your particular motor requirements. *All* Howell motors have them.

Gearmotors Cut Costs. Actual savings achieved by Howell gearmotors over separate motor-plus-reducer-plus-coupling drives are available for your study. Just request "Gearmotor Savings Table" when you write for catalog.

Write for Bulletin GM-1

Howell gearmotor capacities: Parallel shaft, 1 to 150 hp; Right angle shaft, ½ to 40 hp.

HOWELL MOTORS

HOWELL ELECTRIC MOTORS CO., HOWELL, MICH.
Precision-built motors for industry since 1915

HOWELL motors

AUTOMOTIVE INDUSTRIES . . .
is your News Magazine of Automotive and Aviation
MANUFACTURING

Engineer THE PERFORMANCE with . . .

DSP *Leaf* **SPRINGS**

FIFTY YEARS' experience with all types of leaf spring design, plus rigid manufacturing standards and controls, assure complete spring satisfaction, superior spring performance, and longer spring life.

That's why *the makers of most of America's trucks use DSP Leaf Springs as original equipment.*

Automotive Division

DETROIT STEEL PRODUCTS COMPANY

Also Makers of Fenestra *Building Products*

2250 E. Grand Blvd., Detroit 11, Michigan

SINCE 1904 — ORIGINAL EQUIPMENT ON CARS, TRUCKS, CABS, BUSES, TRAILERS

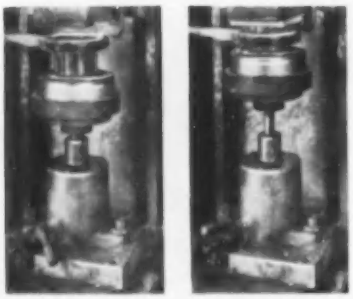
The EASY-FLO equation for strong, low-cost metal joining

PREPLACING THE ALLOY, plus a fast handling and heating setup – that's the EASY-FLO low-temperature silver brazing equation for fast, economical production of virtually indestructible metal joints.

A TYPICAL EXAMPLE is the clutch drum of the HOMELITE Model 17 Chain Saw–noted for its go-power to cut fast without forcing or jamming. At left you see how this drum is produced. EASY-FLO 45 washers and parts are assembled and are then Handy Fluxed and induction brazed with a time cycle per assembly of *only 24 seconds.*

. . . and how's this for STRENGTH?

The manufacturer – HOMELITE CORP., reports: *"there hasn't been a field failure in the 5 years the drums have been EASY-FLO brazed."* Considering the rough, tough, stop-go character of chain saw operation, this provides convincing proof that EASY-FLO joints are virtually indestructible.



Left: Induction brazing fixture with table in loading position. Air valve raises table to brazing position (right). Both joints are brazed at same time.

Unretouched photo shows one of the assemblies after testing to destruction. Despite the terrific force it took to tear the drum apart, the EASY-FLO 45 joints are still intact. That's typical EASY-FLO BRAZED STRENGTH.

Get the full story in Bulletin 20

This bulletin tells why EASY-FLO brazing is inherently fast, reliable and economical. It also gives valuable data on joint design and fast brazing production methods. Write for a copy today.

HANDY & HARMAN

General Offices: 82 Fulton St., New York 38, N. Y.

DISTRIBUTORS IN PRINCIPAL CITIES

OFFICES and PLANTS
BRIDGEPORT, CONN.
PROVIDENCE, R. I.
CHICAGO, ILL.
CLEVELAND, OHIO
DETROIT, MICH.
LOS ANGELES, CALIF.
TORONTO, CANADA
MONTREAL, CANADA

There's no ". . . or equal" for EASY-FLO and SIL-FOS

Making Industrial America Stronger

(*Continued from page* 80)

sion measuring devices, materials handling, communications, inspection, gaging, and machine tool accessories.

This array of equipment will be supplemented by another major feature—a joint presentation by eight universities of their latest research projects relating to industrial production. The eight universities are Case Institute of Technology, Cornell University, Illinois Institute of Technology, University of Illinois, Massachusetts Institute of Technology, University of Michigan, Northwestern University and Ohio State University.

Included in the university exhibits will be the first operating scale model of a nuclear reactor for industrial uses ever shown publicly. Other projects will consist of a punched-tape control for milling machines, titanium and aluminum machining, servo-mechanism connected to a combustion chamber for automatic control of combustion, flamometer to measure the turbulence of flame, and research in high-speed metal cutting with a torque dynamometer and a thermocouple capable of measuring, during the cutting operation, the temperature at the high speed tool and the surface being machined.

Coliseum Machinery Show

The Coliseum Machinery Show is planned to attract thousands of people from industry. About 90 manufacturers are setting up exhibits. Major display equipment will include general purpose machine tools, speciality machine tools, portable hand tools, and accessories.

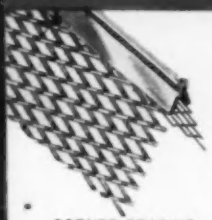
Participating in this show are companies that are not members of the National Machine Tool Builders' Association. There will be several exhibits of foreign machine tools.

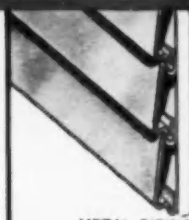
AUTOMOTIVE INDUSTRIES . . .

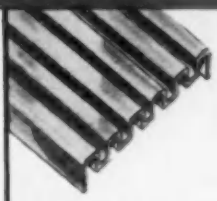
is your News Magazine of Automotive and Aviation

MANUFACTURING

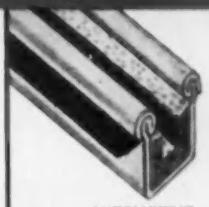
The Shapes of Things to Come

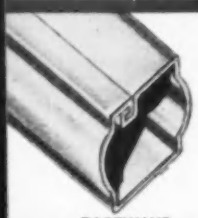

CORNER BEADING

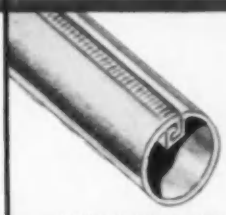

METAL SIDING


METAL DECK—FLUTING

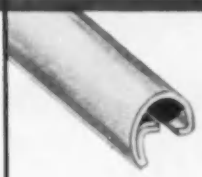
STAINLESS—GALVANIZED TRIM

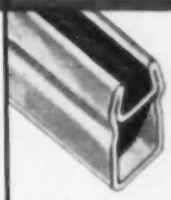

AUTOMOTIVE WEATHERSTRIP


RACEWAYS

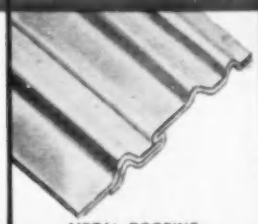

LOCK SEAM TUBING

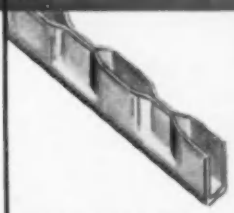
WINDOW SECTIONS


MOULDING

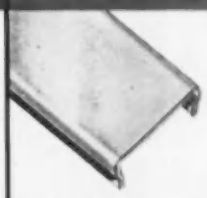

NAILING FLANGES

LOCK SEAM BOX SECTIONS


METAL ROOFING


IRREGULAR PATTERNS

COATED METAL PRICE STRIPS


SHEET and STRIP FLANGING

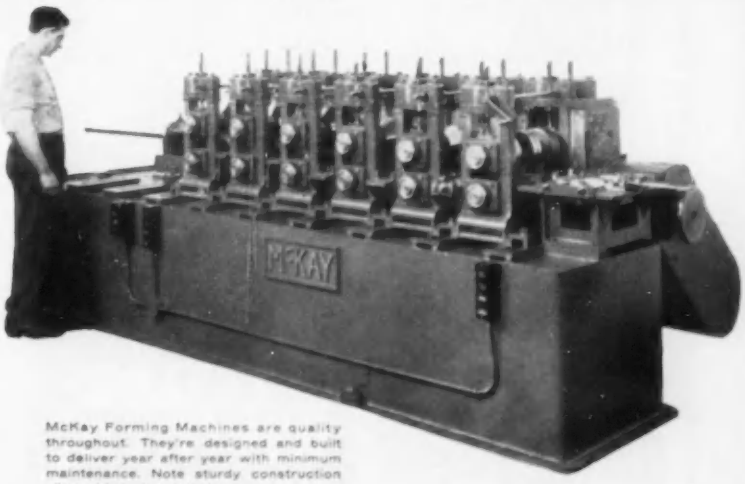
Call for McKAY FORMING MACHINERY

Two words that best describe McKay Forming Machines are "precision" and "ruggedness."

McKay Forming Machines are the last word in quality. They're designed and built to perform with extreme accuracy year after year. McKay users the world over know that quality is never sacrificed, even in the smallest details, for the sake of marketing a "cheaper" unit.

And McKay Forming Machines are built to customers' requirements with an eye to the future. They're machines that will not only meet today's needs, but machines that are ready for the faster speeds, tougher metals and more intricate shapes of tomorrow.

Be sure you have checked with McKay before you order forming equipment. You'll find this unmatched precision and ruggedness pays off in better forming at greatly reduced costs. And with a McKay—you're ready for tomorrow!



McKay Forming Machines are quality throughout. They're designed and built to deliver year after year with minimum maintenance. Note sturdy construction of machine pictured above.

The McKAY MACHINE Company
YOUNGSTOWN, OHIO

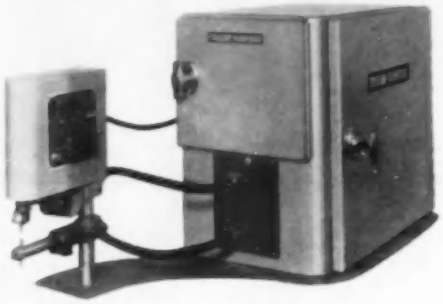
McK

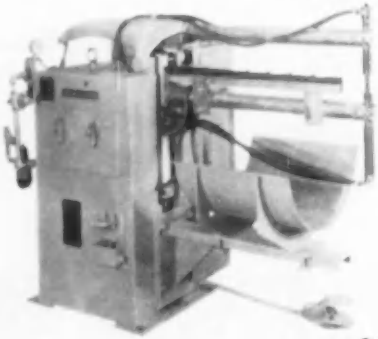
ENGINEERS AND DESIGNERS OF EQUIPMENT FOR THE AUTOMOTIVE, FABRICATING AND STEEL INDUSTRIES

STANDARD ★ MODIFIED ★ SPECIAL RESISTANCE WELDERS

Standard Resistance Welder

Efficient for all basic uses; low operating cost, prompt delivery, long service.



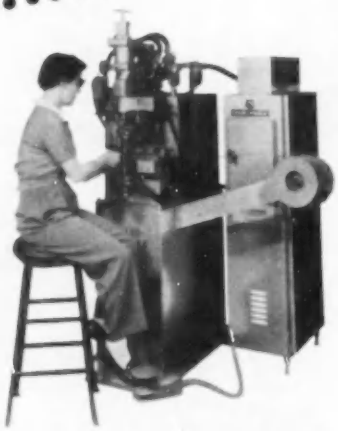


Standard Resistance Welder With Special Tooling

Modified to suit your requirements; increased production, low cost retooling.

Special Resistance Welder

Built for your specific needs; mass production of special products at lowest cost per unit.



Resistance Welders Since 1898

Sales and Service

CHARLOTTE • CHATTANOOGA
CHICAGO • CLEVELAND • DALLAS
DAYTON • DENVER • DETROIT
LOS ANGELES • PHILADELPHIA
PORTLAND, OREGON
SEATTLE, WASHINGTON
ST. LOUIS • STAMFORD
OAKVILLE AND WINDSOR, ONTARIO

TAYLOR-WINFIELD
RESISTANCE WELDERS
SPOT • PROJECTION • SEAM • FLASH-BUTT

THE TAYLOR-WINFIELD CORPORATION WARREN, OHIO

BOOKS . . .

ASTM COPPER STRIP CORROSION STANDARDS, *published by American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa. Price, $25.00 per set.* These standards are now available for use with Method D 130 in determining the corrosiveness of automotive gasoline, aircraft engine fuels, farm tractor fuel, cleaners (Stoddard) solvent, Diesel fuel, fuel oil (distillate) and certain other petroleum products. In Method D 130, a polished copper strip is immersed at a definite temperature for a definite time in a sample of the material being tested. The copper strip is then washed and compared and evaluated with the Reference ASTM Copper Strip Corrosion Standards. The reference standards comprise thirteen various colored strips produced by six-color lithograph on aluminum, arranged according to increasing severity of attack. A marginal table lists the number and description of the reference strips according to Method D 130. Instructions for use are on the reverse side.

CAUSES OF INDUSTRIAL PEACE UNDER COLLECTIVE BARGAINING, *edited by Clinton S. Golden and Virginia D. Parker, published by Harper & Brothers, 49 East 33rd St., New York 16, N. Y. Price, $4.75.* Brought out by the National Planning Association, this book incorporates the major findings of a seven-year study of constructive labor-management relations in 30 representative concerns throughout the U. S. The best solution to labor problems, the NPA Committee on the Causes of Industrial Peace feels, is to be found by studying the ways many companies have maintained harmonious labor relations over the years rather than the usually studied cases of labor strife. The overwhelming majority of companies and unions bargain peacefully year in and year out, without the desire or need for intervention by outside parties. The main conclusion of the 45 industrial experts, whose findings are presented in the book, is that the important factor in thousands of unpublicized harmonious relationships is a determined and active striving for industrial peace by employers and unions. It found this approach in every one of the 30 companies which had experienced peaceful relations —sometimes under very difficult circumstances. The firms studied are fairly typical of the great bulk of medium-sized companies throughout the country in terms of kind and size of work force, the degree of profitability, technological change, and the position in their industries and communities.

Mexican Government Suspends 1955 Pan American Road Race

In an unexpected move, for alleged "safety" reasons, the Mexican Government has suspended the sixth running of the Pan American Road Race, The event was orginally scheduled to be held from Dec. 2 to 5 this year.

Unofficially, it was reported the federal action was influenced by the Le Mans Race tragedy earlier this year and U.S. action in calling off certain races. In addition, it has become increasingly difficult to repair the road in time after the ravages of the heavy rainy season.

YOUNGSTOWN, OHIO

DU PONT

Better Things for Better Living ... through Chemistry

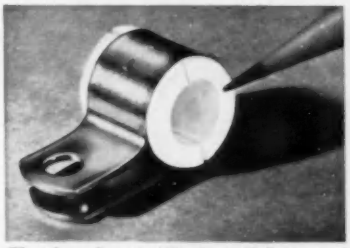
AUTOMOTIVE ENGINEERING NEWS

PROPERTY AND APPLICATION DATA ON THESE VERSATILE ENGINEERING MATERIALS: "ZYTEL," "ALATHON," "TEFLON," "LUCITE."

No. 5 — 1955

Line clamps of TEFLON® prevent galling, binding

An important property of Du Pont "Teflon" tetrafluoroethylene resin is its very low coefficient of friction. This property has helped improve the clamp used to hold hydraulic lines in the wings of a jet fighter. Materials used previously held the line too tightly—it would gall



There's an insert of Du Pont "Teflon" tetrafluoroethylene resin inside this clamp. The smooth surface of "Teflon" prevents hydraulic lines from binding. Clamp manufactured by Exacto Industries, Beverly Hills, California; bearing of "Teflon" made by W. S. Shamban & Company, Culver City, California.

or bind when the wings flexed. However, the smooth, wax-like surface of "Teflon"—although holding the line efficiently—permits it to slide back and forth slightly, relieving tension.

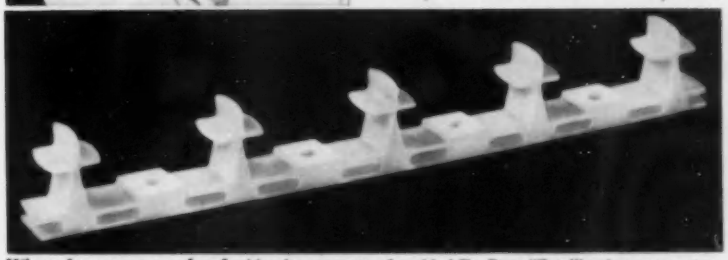
Want a complete property rundown on this unique engineering material, Du Pont "Teflon"? Simply fill out the coupon on the reverse side of this page.

Wiring Time Cut With Molded Insulators of ZYTEL® Nylon

Parts take heavy stress . . . are impervious to solvents

The circumferential clamps used in aircraft wiring come in about twenty different sizes. They are difficult to install and their sharp edges must be protected to avoid wearing the insulation off the wiring.

A supervisor in the manufacturing department of Boeing Airplane Company devised an ingenious way to avoid these difficulties—through use of a support molded of Du Pont "Zytel" nylon resin. Called a "tombstone" because of its shape, this wire support can take any size wire bundle—does away with the nuisance of stocking many sizes of clamps. The insulator of "Zytel" is



When clamps were replaced with wire supports of molded Du Pont "Zytel" nylon, many man-hours were saved in wiring planes. Stand-off insulators are manufactured by the Nylon Molding Corporation, Garwood, New Jersey, under license of Boeing Airplane Company, Seattle, Wash.

considerably lighter, can take heavy stress in all directions and is impervious to solvents—including gasoline and jet fuels. Moreover, "Zytel" resists fungus, and has excellent dielectric properties.

Many Man-Hours Saved

Although these advantages are impressive, even more so are the man-hours that can be saved in wiring. Engineers have estimated that the "tombstones" will mean a saving of up to 500 man-hours for some planes. For jets, this figure may be much higher.

The supports of "Zytel" are molded inexpensively—cost only 1/10 as much as circumferential clamps. Perhaps *you* have a product or process that will be improved by utilizing the properties of molded Du Pont "Zytel" nylon. Use the coupon on the back of this page for more information on this versatile engineering material.

OVER

Instrument panels of 1955 model automobiles utilize the sparkling, lasting beauty of Du Pont "Lucite" acrylic resin. Precision parts of DuPont "Lucite" can be economically produced by the injection molding technique.

Tail lights of "Lucite" help assure top visibility in all weather. Du Pont "Lucite" resists crazing and breaking.

DU PONT

Better Things for Better Living ... through Chemistry

AUTOMOTIVE ENGINEERING NEWS

PROPERTY AND APPLICATION DATA ON THESE VERSATILE ENGINEERING MATERIALS: "ZYTEL," "ALATHON," "TEFLON," "LUCITE."

No. 5 — 1955

TEFLON® and ZYTEL® nylon combine to make a better relay

Type TQ miniature telephone type relays operate at about 150°F. and are used for power switching duties—solenoids, valves and magnetic motors. The bobbin on this relay is molded Du Pont "Zytel" nylon resin—chosen because of its lightness, strength in thin sections, and high insulating properties. It will not gas at operating temperatures.

The wire is coated with Du Pont "Teflon" tetrafluoroethylene resin.

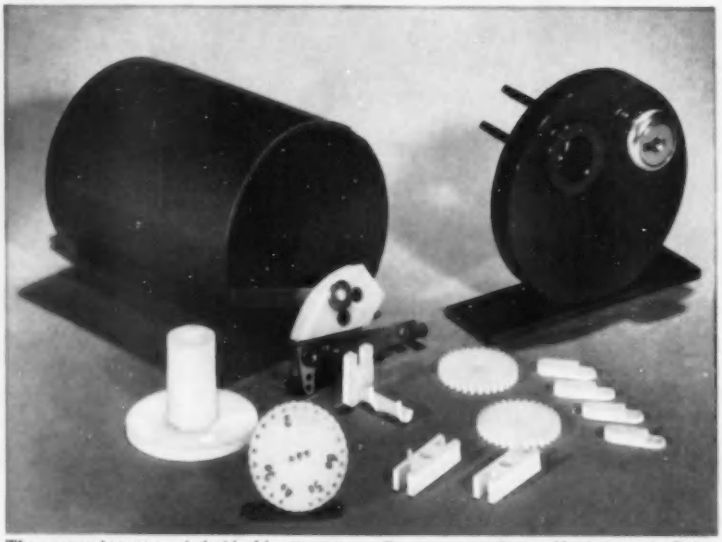
Miniature telephone type relays use "Zytel" nylon resin for the bobbin, and wire coated with "Teflon" tetrafluoroethylene resin to assure superior insulating performance. Relays manufactured by Advance Electric & Relay Co., Burbank, California.

"Teflon" is an electrical insulating material that's especially suited for tough operating conditions. It has good thermal expansion properties and will not gas.

Can "Teflon" or "Zytel" nylon help improve your electrical systems? Use the coupon on this page for complete property information on these Du Pont engineering materials.

Zytel® Nylon Used Throughout New Ignition-Type Governor

This speed governor is mounted under the dashboard of a car or truck. It has a calibrated dial showing speeds to 60 miles per hour. To operate, the governor is unlocked and set to the speed desired. The speedometer cable is mounted to the rear of the box and drives a governor which controls the electrical contacts. A jumper cable runs from the unit to the speedometer on the dashboard. When the speed is exceeded, a set of contacts break the ignition circuit.



The case and many parts inside this governor are molded of Du Pont "Zytel" nylon resin. "Zytel" is durable, lightweight, and parts made from "Zytel" require little or no lubrication. Governor manufactured by Automotive Safety Speed Control Corp., Fitchburg, Massachusetts. Parts molded of "Zytel" by F. J. Kirk Molding Company, Clinton, Massachusetts.

Including the case, fourteen parts of Du Pont "Zytel" nylon resin are used on the governor. "Zytel" provides the lightness necessary to minimize inertia—the parts weigh only 5½ ounces. It also gives unusual wear-resistance for moving parts. In a recent test, the governor was run continuously for two weeks at a speed equivalent to 600 mph. Absolutely no wear was visible on the bearings, gears and other parts.

Other Important Properties

The governor needs good dielectric properties to function accurately. "Zytel" has them. Another advantage "Zytel" offers is *moldability*. Intricately shaped precision pieces like the gears and bearings can be mass-produced by the injection-molding process. This technique is efficient and will often mean a substantial savings in production costs.

Investigate Du Pont engineering materials in your product development programs

One of the family of these versatile engineering materials is often a key factor in product improvement or new product design. The wide range of properties available with "Alathon"® polyethylene resin, "Lucite"® acrylic resin, "Teflon"® tetrafluoroethylene resin, and "Zytel"® nylon resin are helping solve industrial design problems.

NEED MORE INFORMATION? Clip the coupon for additional data on the properties and application of these Du Pont engineering materials.

E. I. DU PONT DE NEMOURS & CO. (Inc.) POLYCHEMICALS DEPARTMENT
Room 179, Du Pont Building, Wilmington 98, Delaware
In Canada: Du Pont Company of Canada, Ltd., P. O. Box 660, Montreal, Quebec

Please send me more information on the Du Pont engineering materials checked: ☐ *"Zytel"*; ☐ *"Alathon"*; ☐ *"Teflon"*; ☐ *"Lucite". I am interested in evaluating these materials for:* _____

NAME _____ POSITION _____

COMPANY _____

STREET _____

CITY _____ STATE _____

TYPE OF BUSINESS _____

®"Alathon", "Zytel", "Lucite", "Teflon" are registered trade-marks of E. I. du Pont de Nemours & Co. (Inc.)

100 Years of Progress in Metalworking

(*Continued from page* 87)

the Robbins & Lawrence plant in Windsor, Vermont. Many of these milling machines were among the 150 machine tools which this company shipped to the Enfield Armory in 1855.

At this point the chain reaction splits. On the one hand, the Howe plain milling machine inspired the Lincoln milling machine designed in 1855 by Francis A. Pratt for George S. Lincoln & Co., Hartford, Conn., forerunner of Taylor & Fenn Co. Subsequent to 1860 hundreds of these machines were manufactured by Pratt & Whitney.

On the other hand, Howe's millers influenced more advanced plain millers by Brown & Sharpe and likewise the universal milling machine built originally by Joseph R. Brown for Mr. Howe, when the latter was superintendent of the Providence Tool Co. It was for fluting the newly invented twist drills. Incidentally, this association led to Frederick W. Howe's being elected the first president of Brown & Sharpe Mfg. Co., when it was incorporated in 1868—thirty-five years after it was founded as a partnership.

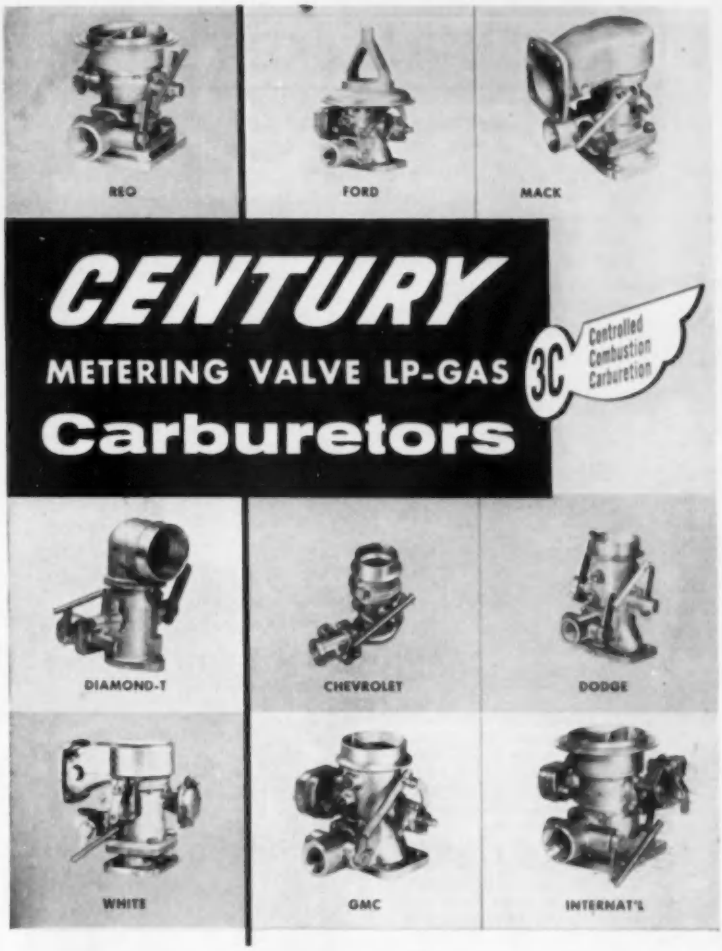
Certain basic features inherited from these old machines can be detected in the finest American milling machines of today. Similar continuity in design thinking can be detected in many other distinctive types of American machine tools—including boring mills—both horizontal and vertical-planers and shapers, turret lathes and

MAKING INDUSTRIAL AMERICA STRONGER

automatics. This is not merely a matter of tradition; it is because pioneer machine tool builders in America had a remarkable faculty for being "right" in their original designs.

Another highly important line of development peculiar to the American machine tool industry is that of the turret lathe. The first big improvement in the basic lathe was made by Henry Maudslay in England in 1795 when he developed the tool carrying and tool guiding slide rest. This was the first step in transferring skill to

(*Turn to page* 298, *please*)



For All Trucks

ENGINEERED *for each engine*
CALIBRATED *to each engine*
PRE-SET *to a performance curve*

NOT AFFECTED BY...

TEMPERATURE CHANGES
HIGH OR LOW ALTITUDES
CHANGING GAS PRESSURES

STARTS INSTANTLY *in coldest weather.*
GIVES INSTANT *power—no choking or fluttering.*
IDLES PERFECTLY *in all conditions.*
BALANCES POWER *of each cylinder.*
NO MULTIPLE ADJUSTMENTS—*tune up only.*
PERFORMS AT ALL *speeds to pre-set perfection.*

Set it! Seal it! Forget it!

CENTURY GAS EQUIPMENT CO., 11188 Long Beach Blvd., Lynwood, Calif.

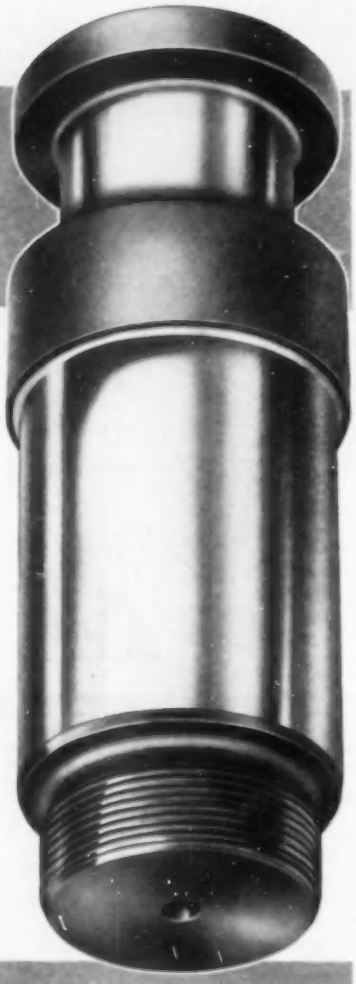
COLISEUM MACHINERY SHOW

(*Continued from page 232*)

system, designed for the volume handling of paper and cardboard. It will bale up to 30 tons in an eight hour shift, the bales weighing from 800 to 1200 lb. This baling system is made up of a feed conveyor, a hogger that cuts the materials to be baled, a blower that pushes the hogged materials into a cyclone, from which the air and solid materials are separated, and the continuous, horizontal, hydraulic baling press. The entire system is operated by one man, and requires no pit.

Circle 210 on postcard for more data

Hardened and Ground Parts are our *Specialty*



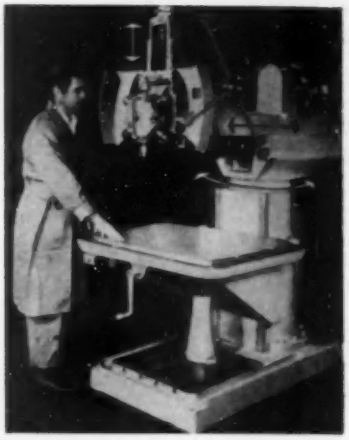
This king pin is truly king-size: 8" long and weighs about 12 lbs. We machined it out of No. 3140-2½" bar steel. After heat treating, bearing surface was given the specified fine finish-grind to 2½" dia., +.000 —.001.

Parts like this are our specialty —we've been making them exclusively for the automobile industry for more than 40 years. Each year has added to our knowledge and skill in precise machining, scientifically-controlled heat treating and micro-finish grinding. Let us show you what we can do with one of your tough jobs. Write or wire.

Henry W. Brown
PRESIDENT

Experienced production on:
King Pins • Wheel Studs
Shackle Bolts • Shackle Pins
Brake Anchor Bolts
Countershafts • Idler Shafts
Stub Axle Shafts
Steering Ball Bolts
5th-Wheel Rocker Shafts
Water Pump Shafts
. . . anything in the hardened and ground line, of any analysis steel, up to 4⅛" diameter.

THE BROWN CORP.
213 BELLEVUE AVE. SYRACUSE, N. Y.
C. H. Ehlert, 3407 Clarendon Rd., Cleveland • R. F. Spring, 4710 Belfour Rd., Detroit • R. C. Sanderson, 6651 N. Ashland Ave., Chicago • Harry J. Windmiller, 1704 Carlton, Fort Worth • Lyle H. Johnson, 7358 Westwood Blvd., Los Angeles, Calif. • John R. Hurd, 3811 S.E. Yamhill St., Portland, Ore.



Burg Tool Mfg. Co., radial turret drill

BURG TOOL MFG. CO.

Booth 716

All turret drill models, including the 2A and 2B six-spindle, power indexing automatics, the 2BH six-spindle and eight-spindle hydraulic automatics and the new six-spindle, power indexing radial will be shown and operating for on-the-spot demonstrations.

The radial turret drill features preselective spindle speeds (225-3000 rpm); preselective depth control for each spindle; 8 in. stroke; power indexing; hydraulic clamping; two hp motor; ¾ in. drill capacity in steel; maximum radius of 42 in; minimum radius of 15 in.; table size of 36 by 24 in.

Circle 211 on postcard for more data

HAMMOND MACHINERY BUILDERS

Booth 214

The new Model CM-6 carbide chip breaker grinder will be shown as bench and floor models, with or without a cup wheel arrangement. A ½-hp motor is provided for medium duty requirements. It will take a six in. diameter chip breaker wheel, and cup wheel arrangement, when furnished, accommodates a six in. diameter cup wheel. An angle vise with four swivel adjustments, furnished on the cup breaker end, provides for all angular settings and accommodates tools up to two in. Vertical and horizontal movements on the chip breaker end are calibrated to 0.001 in. A large drip feed tank for each end of the grinder supplies an ample drip of coolant to keep the diamond wheels clean and free cutting. A removable coolant collecting drawer returns the coolant to the supply tanks. Work table on the cup wheel side adjusts

Graph-Mo® steel die makes this "impossible" draw without galling or scoring

MANUFACTURERS Service Company in Cleveland was faced with a tough problem of making a die for a dryer fan housing 3⅞" deep. The scroll shape made it an all but impossible draw for ordinary die steels—they'd pick up and gall. Looking for an answer, they tried Graph-Mo®—one of four graphitic tool steels developed by the Timken Company. Result: good clean parts, no scuffing, no galling, no scoring.

Graph-Mo tool steel can handle jobs like this because of its unique composition. It contains free graphite, one of the best natural lubricants. This graphite gives Graph-Mo outstanding anti-friction properties and prevents scuffing and galling even in such difficult draws as this one.

Graph-Mo has a second great advantage over conventional tool steels: It outwears them on an average of three to one. Along with the graphite, Graph-Mo contains millions of tiny particles of diamond-hard carbides, one of the hardest-wearing substances known.

Despite its superior wear resistance, Graph-Mo machines about 30% easier than conventional tool steels. And it responds uniformly to heat treatment, thus requiring a minimum of grinding on the hardened dies.

Graph-Mo is one of four graphitic tool steels developed by the Timken Company. Would you like more information about their uses in dies, punches, gages and machine parts? Write for the new Timken Graphitic Steel Data Book just out. The Timken Roller Bearing Company, Steel & Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH

SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS TUBING

Parts for this piston and sleeve assembly were mated and lapped to a precision fit. Clearance tolerances were maintained on the assembly to less than .00006". Inside diameter, concentricity and grooves were also held to very close tolerances.

ACME CAN PRODUCE PRECISION PARTS OR ASSEMBLIES TO YOUR ORDER

Acme will produce, to your specifications, finished hardened and ground parts from ferrous or other materials, complete from raw stock or from your semi-finished parts, in quantities from one to a million pieces.

Parts can be produced as individual pieces or as assemblies, with or without pistons. Tolerances to within .00001" or less, and corresponding micro-inch finishes can be maintained.

Acme's modern plant contains over 250 metal-working machines and 150 pieces of laboratory testing and inspecting equipment. Services include complete machining, heat treating, grinding, lapping and honing operations.

For over 35 years Acme has been producing hardened and ground parts for thousands of satisfied customers.

Send your prints and specifications to the factory for quotation, or request a representative to call on you.

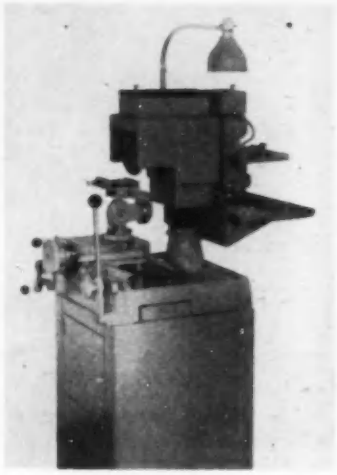
Write for literature or additional information.

See our file in Sweet's.

ACME INDUSTRIAL COMPANY
707 N. LAFLIN STREET, CHICAGO 7, ILLINOIS
Manufacturers of standard dowel pins • Chamfer micrometer gages • Drill jig bushings • Portable bench centers • Roughness comparison specimens • Hardened and ground parts manufactured to order

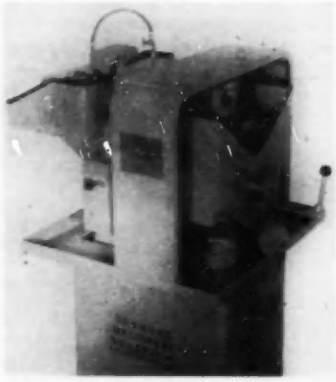
from 30 deg above to 30 deg below horizontal.

The model CBW-6 is designed principally for heavy-duty production chip breaker grinding, but may also be furnished with a cup wheel arrangement. It is designed for use in plants where large quantities of tools are ground. A ½-hp or 1-hp drive



Hammond Model CM-6 chip breaker and diamond finishing grinder.

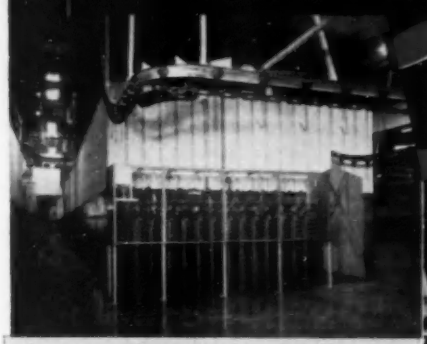
motor delivers adequate power through V-belt drive for all production grinding requirements, including plunge grinding. Chip breaker end accommodates six in. diameter wheel, and cup wheel end uses six in. diameter cup wheel. An angle vise with four swivel adjustments furnished on the chip breaker end provides for all angular settings and accommodates tools up to two inch. Table assembly on chip breaker end reciprocates on ball bearing ways, and length of



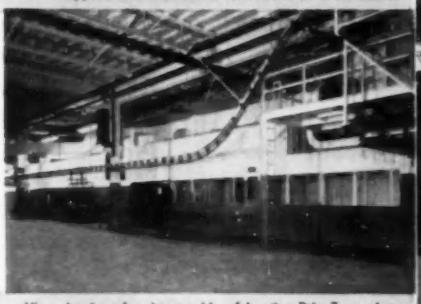
Hammond Model CBW-6 chip breaker grinder with cup wheel end.

COMPLETE *Finishing* SYSTEMS

. . . for ENAMELS • LACQUER • PAINT • VARNISH



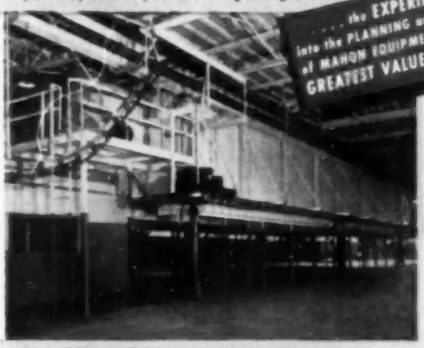
Exterior view of Ventilated Active Drip Zone. Clean, Filtered Air is Supplied to this enclosure. Fume-laden air is exhausted.



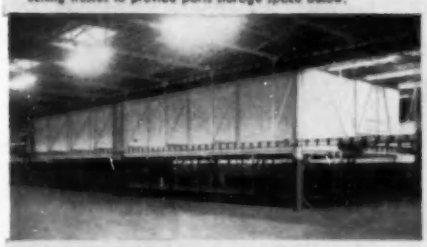
View showing glass in one side of Inactive Drip Zone where parts may be seen prior to entering Baking Oven.

View of Mahon Flow-Coating Equipment at Chrysler Corporation of Canada, Limited. This is part of a Complete Mahon Finishing System for Coating Black Enamel Parts.

. . . the EXPERIENCE that goes into the PLANNING and ENGINEERING of MAHON EQUIPMENT is the item of GREATEST VALUE to YOU!



View of Mahon 450° Enamel Baking Oven. Oven is built against ceiling trusses to provide parts storage space below.



Another view of the Enamel Baking Oven. Finish is baked for 20 minutes at 450° in this 80 Ft. x 24 Ft. Mahon Oven.

Black Enamel Parts at CHRYSLER CORPORATION of CANADA, LIMITED, are FLOW-COATED in MAHON FINISHING SYSTEM!

In addition to the body finishing system at the Windsor plant of Chrysler Corporation of Canada, Limited, Mahon also installed a complete finishing system for black enamel parts. This is a Flow-Coating System which includes a Mahon Flow-Coating Machine, a Ventilated Active Drip Zone, a Ventilated Inactive Drip Zone, and a 450° Finish Baking Oven with storage space below. Two Enamel Mixing Tanks and a Solvent Tank are provided outside the enclosure. The recirculating unit is equipped to automatically maintain the enamel at a specific temperature in the Flow-Coating Chamber. This is a typical Mahon Flow-Coating System, complete in every detail —automatic from start to stop. If you have a finishing problem, or are contemplating new finishing equipment, you will find that Mahon engineers are better qualified to advise you on both methods and equipment requirements . . . and better qualified to do the all-important planning and engineering of equipment—which is the key to fine finishes at minimum cost. Whether your job is to be Flow-Coated, Dip-Coated, or Spray Painted either Manually or by Electrostatic Process, you will find that Mahon equipment will serve you better, because it is engineered better and built better for more economical operation over a longer period of time. Mahon will do a complete job for you on one contract—undivided responsibility for the entire system insures proper coordination and safeguards you against complications which can upset your production schedules. See Mahon's Insert in Sweet's Plant Engineering File, or write for Catalog A-656.

THE R. C. MAHON COMPANY • Detroit 34, Michigan

SALES ENGINEERING OFFICES in NEW YORK AND CHICAGO

Engineers and Manufacturers of Complete Finishing Systems—including Metal Cleaning, Pickling, and Rust Proofing Equipment, Hydro-Filter Spray Booths, Dip and Flow Coaters, Filtered Air Supply Systems, Drying and Baking Ovens, Cooling Tunnels, Heat Treating and Quenching Equipment for Aluminum and Magnesium, and other Units of Special Production Equipment.

MAHON

Automate for top performance with...

T-J Spacemaker CYLINDERS

Style SM5 shown

- The Only Cylinders with all the Extras as Standard
- Oil pressure to 750—AIR to 200 P.S.I.
- New Compact Design . . . Saves up to 40% Space
- Proven Performance . . . with Extra High Safety Factor
- Super Cushion Flexible Seals for Air . . . Now Self-Aligning Master Oil Cushion
- Hard Chrome Plated Bodies and Piston Rods (Standard)
- Only from T-J can you get these new ingenious cushion designs

OFF SHELF DELIVERY

More and more of industry's automation problems today—solved with T-J Spacemaker Cylinders! New compact design and many more plus features for a new high in efficient cylinder performance and dependability. Wide range of styles, capacities . . . to help you *save labor, reduce costs* on all kinds of push-pull-lift jobs. Send for bulletin SM-155-1. The Tomkins-Johnson Co., Jackson, Mich.

T-J TOMKINS-JOHNSON
BUILDERS AIR AND HYDRAULIC CYLINDERS CUTTERS CLINCHERS

Member of the National Fluid Power Association

stroke is adjustable. Vertical and horizontal movements of the table assembly on the chip breaker are calibrated to 0.001 in. Self-contained pump and tank unit with special splash guard provides a copious flow of coolant. Work table on cup wheel end adjusts to 15 deg above and 30 deg below horizontal. Table surface is fitted with precision ground reversible wear plates.

Circle 212 on postcard for more data

COMMANDER MFG. CO.

Booth 502

The complete line of Commander production drilling and tapping equipment will be demonstrated.

The Commander Multi-Tapper and the pneumatic tapper will be introduced. The Multi-Tapper is a self-contained, automatically reversing multiple spindle tapping head which can be used on any drill press. Adjustable to tap any number of holes from one to eight in any pattern, it will be available with accessories.

The Pneumatic Tapper is a high speed, single spindle tapping head which can be mounted on any drill press. Higher spindle speeds, fast approach, automatic tap reversal and quick withdrawal from the work, coupled with the Commander spring clutch drive, make it a high production tapping tool.

Among other Commander products to be shown are the Commander Multi-Drill tapper, Lead-Matic Tapper, Select-A-Spindle, Multi-Angle drill unit, drill chip breaker and the precision drilling coolant table.

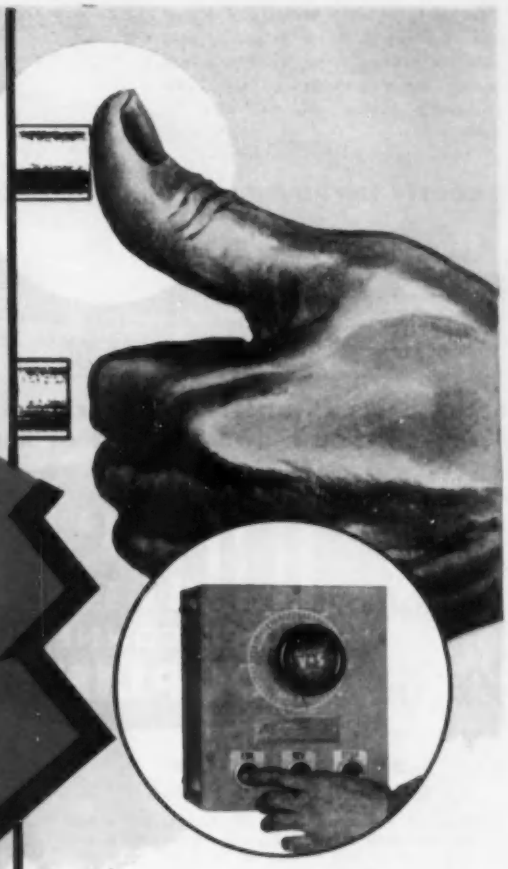
Many accessories will also be shown, some for the first time. Among them are adjustable depth spindles which permit individual adjustment of drilling depth. The Commander fixed posi-

Commander "Lead-Matic" lead screw tapper

Everything's under control...

with the

RELIANCE V★S DRIVE ®



Smooth, versatile Reliance VARIABLE SPEED DRIVES are made to help you keep *everything under control!*

Dynamic response for rapid starting, stopping and reversing; hairline accuracy for maintaining required line speeds; positive, step-by-step assurance of optimum speeds during each processing cycle; precise delicate regulation of quantity, quality, color, shape, form and size . . . in fact, EVERYTHING is precisely controlled by Reliance V★S Drives.

For faster line speeds, smoother acceleration and deceleration, more sensitive tension control and other outstanding production dividends in *your* plant, call the nearest Reliance sales office . . . or write for Bulletin D-2311. *Reliance Electric & Engineering Co., 1123 Ivanhoe Road, Cleveland 10, Ohio; Canadian Division—Welland, Ontario.*

D-1498

RELIANCE ELECTRIC AND ENGINEERING CO.

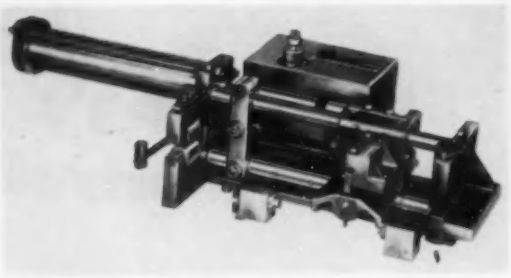
tion plate, which converts any standard Multi-Drill to a fixed spindle multiple drilling head, without eliminating the advantages of the fully adjustable Multi-Drill, will also be shown.

Circle 213 on postcard for more data

COOPER WEYMOUTH, INC.

Booth 444

The 6 in. and 12 in. air-operated, open throat slide feeds for power press operation will be on display. They are made in five sizes and feed lengths up to 26 in. long and up to 18 in. wide on mechanical and hydraulic presses. The slide feeds operate from standard shop air lines and can be set to feed from either side or from front to back, or back to front of presses.



Cooper-Weymouth six in. and 12 in. air-operated slide feeds.

The No. 4060 standard mechanical slide feed operates off the crankshaft of the press. Positive gripping action and accurate stock feeding are features of the unit.

Stock straighteners are available in portable cabinet units, in sizes of six in. up to 24 in., they come equipped with forward, reverse and cutout switch, and may be had in either constant or variable speed drive models. Units are made with five, seven or nine straightening rolls. Pinch rolls and all of the bottom straightening rolls are power driven.

For smaller shops the four-in., plain stock straightener is hand-operated. It is intended for the straightening of smaller parts and shorter job lots. This small unit is made with five, seven or nine straightening rolls, in sizes of 1½ in. up to 12 in.

Two-plane wire straighteners are used in conjunction with mechanical air feeds. They are made with five, seven and nine rolls in each plane, and will take up to 3/16 in. diameter wire.

Circle 214 on postcard for more data

SHAW-BOX CRANE & HOIST DIV. MANNING, MAXWELL & MOORE

Booth 647

A new, lightweight, small, pushbutton controlled electric hoist of the wire rope and drum type will be shown. Series 600 Load Lifter hoists are available with lug, upper hook, and trolley suspensions, in capacities of 1000 to 2000 lb for production lifting jobs.

These new hoists have frames made from aluminum alloy, alloy steel heat-treated gearing with machine shaved teeth, and double brakes. Magnetic control has only 24 volts at push buttons. Machine grooved drums of large diameter, interchangable suspension and positive upper stop to prevent

(*Turn to page 292, please*)

SPECIFICALLY ENGINEERED . . . NEVER MERELY ADAPTED . . .
FOR EACH PARTICULAR TYPE OF APPLICATION

HANSEN
QUICK-CONNECTIVE
COUPLINGS

ONE-WAY SHUT-OFF
Shuts off one side of line

Gives quick connection and disconnection, with instant automatic flow or shut-off. To connect Coupling, and open line to flow of fluid, merely push Plug into Socket. To disconnect, a slight pull on sleeve releases Plug and shuts off supply end of line.

TWO-WAY SHUT-OFF
Shuts off both sides of line

To connect, pull back sleeve and push Plug into Socket. Identical torpedo type valves permit free flow of gas or liquid through Coupling. To disconnect, pull back sleeve . . . Coupling immediately disconnects, valves automatically seal both ends of line. Female pipe thread connections from ⅛" to 1". Available in brass or steel.

STRAIGHT-THROUGH COUPLING

Provides quick connection and disconnection, but does not have shut-off feature. Sizes, ranging from ¼" to 2½", carried in stock. Two special types of straight-through steam Couplings also available—one for low pressures, and one for high pressures.

REPRESENTATIVES IN PRINCIPAL CITIES

Quick-Connective Fluid Line Couplings for
Oil • Hydraulic Fluids
Grease • Steam • Water
Refrigerants • Acetylene
Air • Oxygen • Vacuum
Gasoline • Coolants
Write for Catalog

SINCE 1915 — QUICK-CONNECTIVE FLUID LINE COUPLINGS

THE HANSEN MANUFACTURING COMPANY

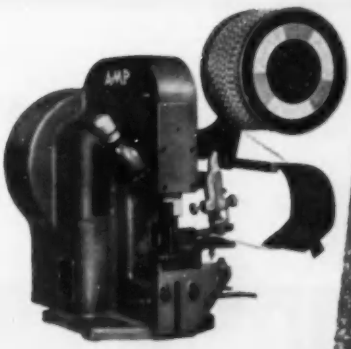
4031 WEST 150th STREET • CLEVELAND 11, OHIO

BUTTON CONTACTS NOW A-MP AUTOMATED FOR LESS COST— MORE RELIABILITY

Another new product, A-MP Automated to reduce cost! This new solderless Button Contact especially designed for automotive and appliance light sockets is made in strip terminal form and supplied on reels for automatic machine application. High speed automated terminations assure uniform high quality and cost savings.

This advanced A-MP Button Contact design provides the following features:

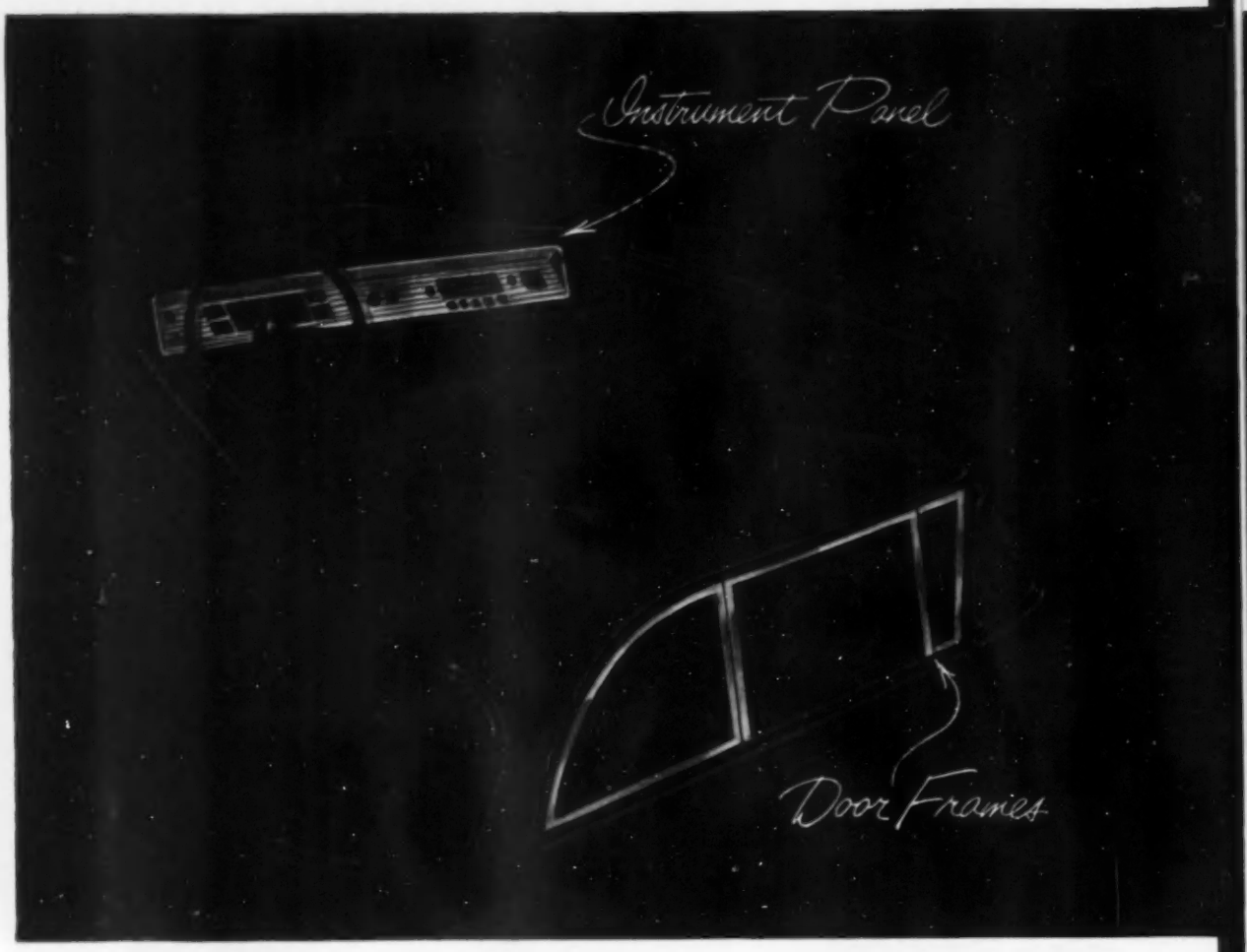
- **Adequate clearance, where space is limited, for twin contact application.**
- **Chamfered edges to permit easy rotation of bulb when locking into twin contact socket.**
- **Special tapered section to secure this Button Contact in phenolic insulating washer.**
- **A-MP's patented Keystone Serrated solderless crimp provides the ultimate in electrical and mechanical performance.**
- **Available for wire sizes 18 thru 14 AWG, in plain brass, tin plated or silver plated finish.**



Send today for your copy of our brochure AMP's Creative Approach to Better Wiring.

AMP

AIRCRAFT-MARINE PRODUCTS, INC.
General Office Harrisburg, Pennsylvania
In Canada: AIRCRAFT-MARINE PRODUCTS OF CANADA, LTD., 1764 Avenue Road, Toronto 12, Ontario, Canada



Here's why you can For Aluminum

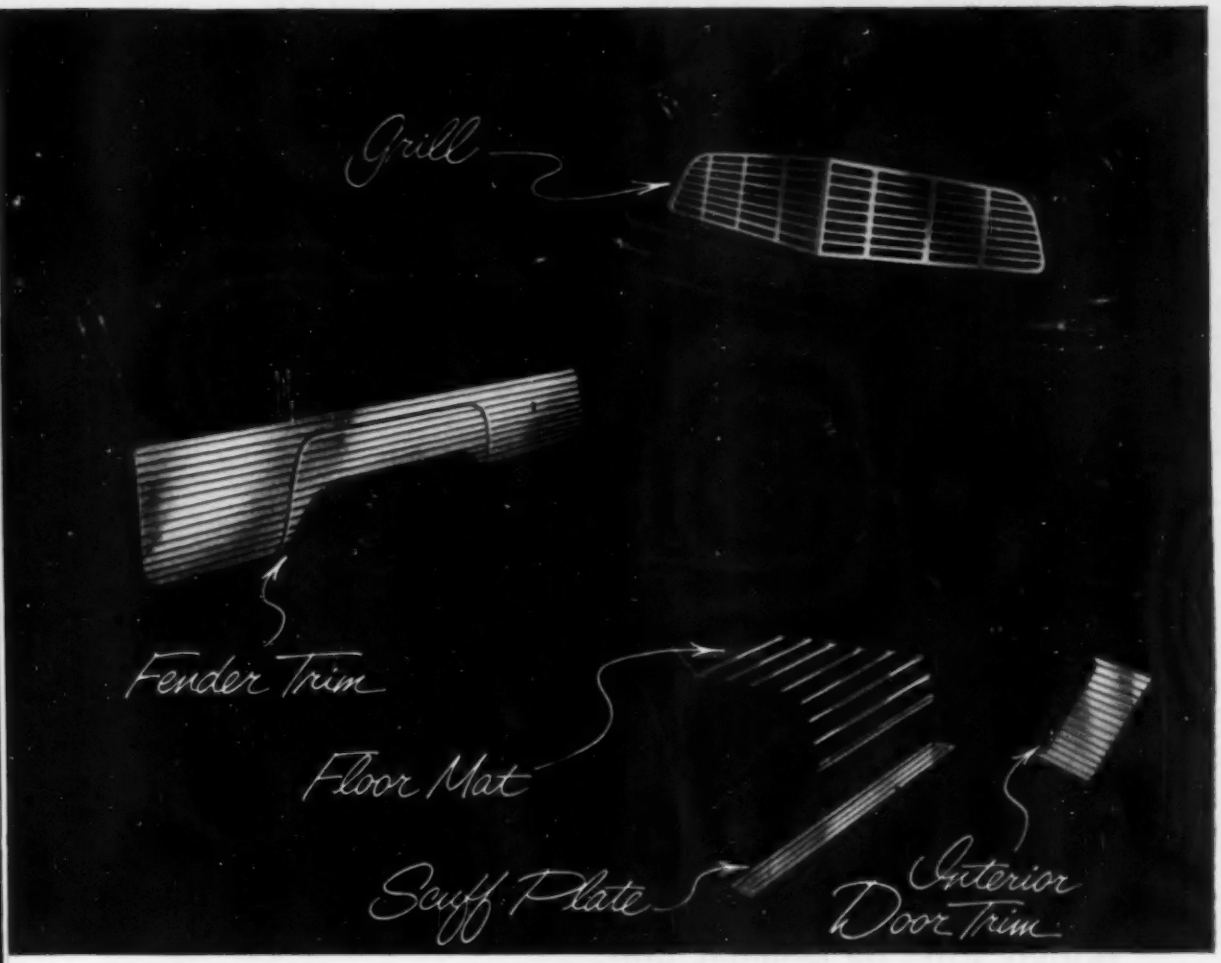
There are over 200 pieces of major production equipment in two Reynolds plants alone. *For complete details write for Reynolds 24-page "Catalog of Facilities."*

Completed parts, like these extruded aluminum window frames produced by Reynolds, cut assembly, handling and other costs for automotive manufacturers.

Reynolds modern equipment and experience assure production of the finest aluminum finishes produced to your specifications.

REYNOLDS ALUMINUM

BLANKING • EMBOSSING • STAMPING • DRAWING • RIVETING • FORMING



Rely on REYNOLDS

Parts and Trim

The sketches above are modifications of actual parts and trim produced by Reynolds Aluminum Fabricating Service. Vast fabricating facilities, experienced design and engineering assistance and quality control from mine to finished product are three good reasons why it pays to rely on Reynolds for your automotive aluminum requirements.

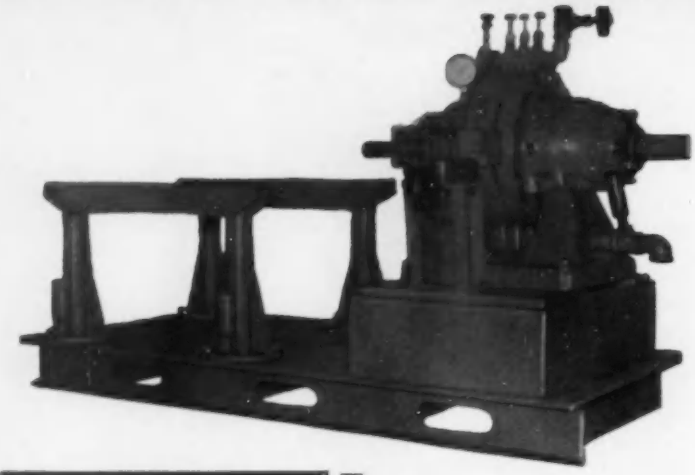
Look to Reynolds Aluminum for the "look of sterling" on your fine automobiles. And let the dual advantage offered by aluminum and Reynolds Aluminum Fabricating Service help reduce your costs and improve your products. For full details, contact the Reynolds office listed under "Aluminum" in your classified telephone directory or write Reynolds Aluminum Fabricating Service, 2087 South Ninth Street, Louisville 1, Kentucky.

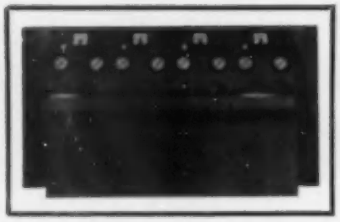
See Reynolds "Do It Yourself" program, Sunday nights on NBC-TV.

FABRICATING SERVICE

ROLL SHAPING • TUBE BENDING • WELDING • BRAZING • FINISHING

HI-EFF TAYLOR DYNAMOMETERS





For Production and Laboratory Testing

Widely used by manufacturers of

• TURBINES • DIESEL ENGINES
• GASOLINE ENGINES • PUMPS • BELTS
• SPARK PLUGS • PISTON RINGS
• SUPERCHARGERS • ELECTRIC MOTORS
• TRANSMISSIONS and DIFFERENTIALS

Electric and Hydraulic Dynamometers—Write for Bulletin 761

TAYLOR DYNAMOMETER & MACHINE CO.

DEPT. AI • 6411 RIVER PARKWAY • MILWAUKEE 13, WISCONSIN

MANUFACTURERS OF DYNAMOMETERS • BALANCING MACHINES • DRILLING MACHINES

International Division—Dummann World Trade Co., Milwaukee 6, Wis., U. S. A.

COLISEUM MACHINERY SHOW

(*Continued from page* 288)

overtravel of hoist hook are additional features. These hoists are available for standard electric currents.

Lightweight, portable aluminum chain blocks, the 'Budgit' "Ji-Cap" aluminum chain blocks, are available in 3, 4, 5, 6, 8 and 10-ton capacities, for service where low headroom, portability and ease of operation are required.

Shaw-Box Crane & Hoist Div. Series 600 Load Lifter hoist

Among their construction features are: alloy steel heat treated gearing and shafts, supported on anti-friction bearings, "equa-torque" gear design which distributes load on two sets of gear teeth, "full-jeweled" load brake, vertical reeving, upper hook one size larger than lower hook, both of the non-fracturing type that open slowly under extreme overloads and a non-gagging four-pocket lift wheel enclosed by a floating chain guide which permits operating hoist in any position.

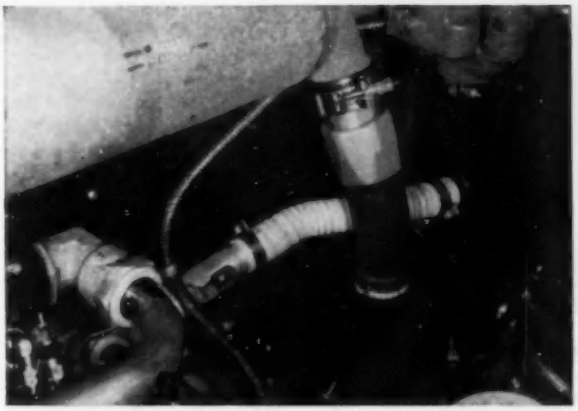
Circle 215 on postcard for more data

FAWICK AIRFLEX DIV FAWICK CORPORATION

Booth 215

Air-operated industrial clutches and brakes, rotorseals and quick-release valves will be displayed and demon-

Simplify Fastening and Joining Problems with MARMAN CLAMPS and COUPLINGS

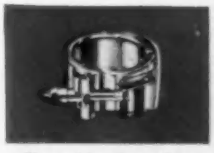


Pictured here are two examples of how Marman products are used to solve clamping problems in a wide range of industrial and aircraft applications.

On this Shear-Speed shaper (upper picture) made by Michigan Tool Co., the mechanism below the workholding ram is protected by a bellows held firmly in position by Marman clamps. Uniform pressure is exerted all around the circumference, there is no troublesome bulge where the clamp is joined.

On North American's F-100 (lower picture) a Marman stainless steel V-band coupling joins the fuel line to the filter. Utmost simplicity has been achieved because the clamp flange has been machined right on the Aeroquip hose fitting. The Marman "quick coupler" latch makes filter change quick and easy.

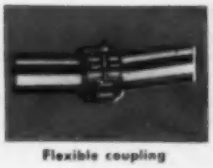
Marman clamps and couplings are available in many standard sizes and types. Special designs can be engineered to meet the most unusual requirements. Write for complete information.



Channel band coupling

LIVE joint system

Adjustable band clamp



Flexible coupling

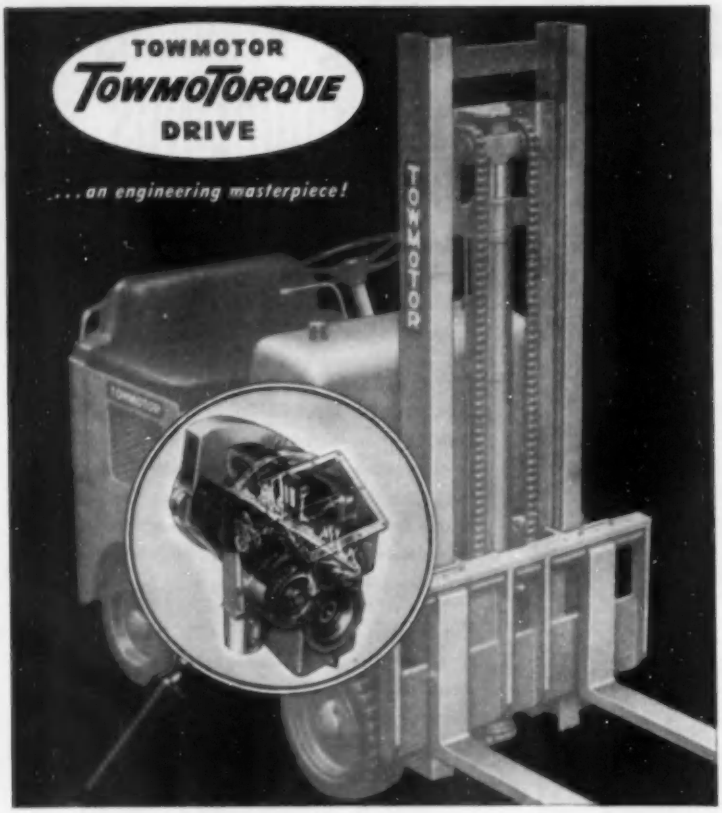
V-band coupling

MARMAN PRODUCTS COMPANY, INC.

A SUBSIDIARY OF Aeroquip CORPORATION

11214 EXPOSITION BLVD., LOS ANGELES, CALIFORNIA

MARMAN PRODUCTS ARE MANUFACTURED UNDER VARIOUS U.S. AND FOREIGN PATENTS AND OTHER PATENTS PENDING



The drive that set a ***NEW STANDARD*** *of*

PERFORMANCE

for Fork Lift Trucks

No other fork lift truck can match the smooth-power performance of a Towmotor with *TowmoTorque* Drive. There's no clutch to throw, no gears to shift. The exclusive *TowmoTorque Creep Control* allows full power for lifting while positioning the truck. "Forward" or "reverse" can be preselected *while truck is in motion* for fast get-away! And *TowmoTorque* lasts the lifetime of the truck with less maintenance than any other drive.

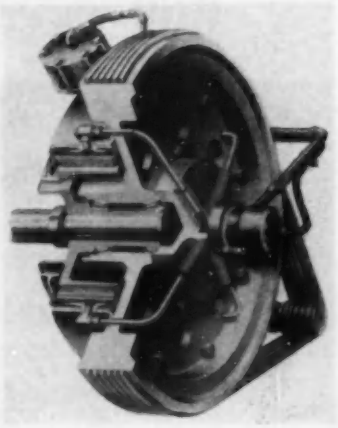
TowmoTorque is the only drive engineered for all fork lift truck operations. It is available in Towmotor Fork Lift Trucks exclusively. Get the facts from your nearby Towmotor Representative, or write TOWMOTOR CORPORATION, Div. 4509, 1226 E. 152nd St., Cleveland 10, Ohio.

TOWMOTOR
THE ONE-MAN-GANG
®

FORK LIFT TRUCKS and TRACTORS
SINCE 1919

Manufactured Only By Towmotor Corporation—The Pioneer Maker Of Fork Lift Trucks

strated. An important feature of the exhibit will be the Fawick standardized press application, designed for open back, inclinable and straight side



Fawick standardized press application for open-back, inclinable and straight side presses from 15 to 110-ton capacity.

presses, ranging from 15— to 110— ton capacity. The application consists of a low-cost packaged unit, including Fawick Airflex clutch, Fawick spring engaged, air-released brake, new flywheel, anti-friction bearings, mounting components, Fawick timing rotor-seal and high speed controls.

Circle 216 on postcard for more data

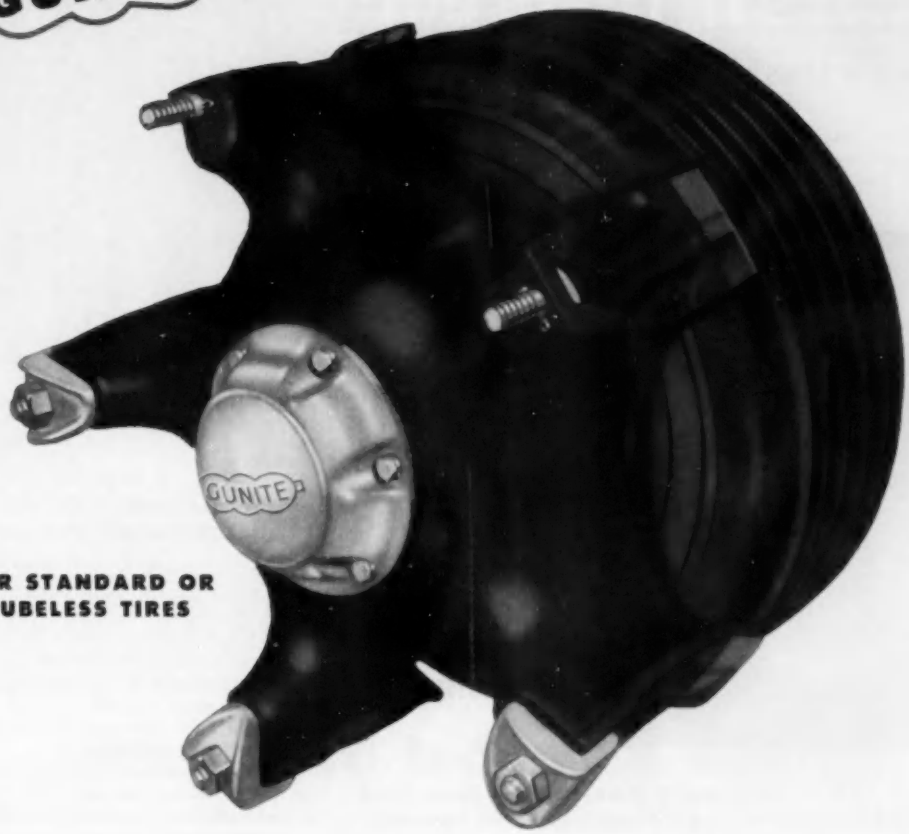
O'NEIL-IRWIN MFG. CO.
Booth 153

Speed of the ram on the Di-Acro Hydra-Power press brake can be controlled by operator by varying the pressure on the pedal. He can "inch" the ram to line up with a scribed line on material and from this line-up position he can brake material of maximum capacity over the full length of the bed. Or he can bring the ram down into bend position slowly on a large sheet of material to avoid danger of material whiplash.

Power is applied to a rotary hydraulic cylinder which is mechanically linked to the cam shaft. A bending cycle is completed in the forward movement of the hydraulic cylinder and another cycle completed in the return movement. Length of stroke can be secured with an adjustment of the stroke control selector, without readjustment of bed or die settings.

Other machines displayed are Hydra-Power benders which form tubing, bar, angle, channel, iron pipe and other ductile materials; rod parters which part off bar stock without distortion; punch presses which punch, blank, form and emboss material to

GUNITE STEEL WHEELS
FOR TRUCKS AND TRAILERS

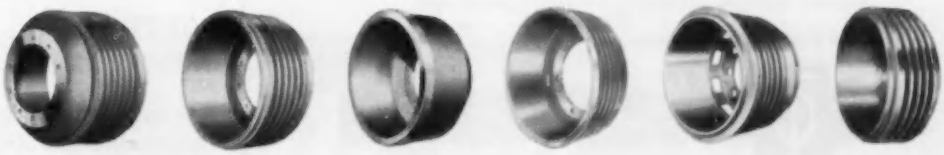


FOR STANDARD OR TUBELESS TIRES

Lightweight...

Economy . . . Strength . . . Gunite Wheels and tubeless tires form the lightest combination at the lowest price. Specify Gunite Wheels on your new equipment.

Gunite Brake Drums for Trucks, Trailers and Busses



GUNITE FOUNDRIES CORPORATION • ROCKFORD, ILLINOIS

Established in 1854

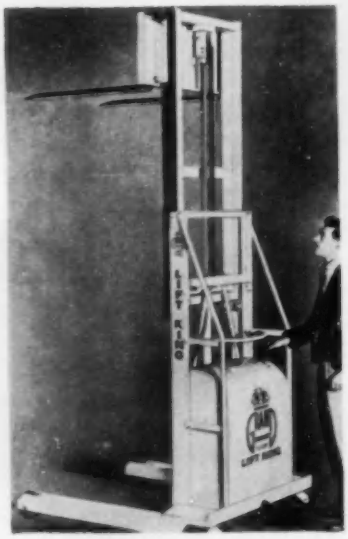
16 gage sheet steel; shears which will cut lightest material and plastic to heavy gage cobalt and stainless steel and notchers which cut notches in material up to 16 gage sheet steel. The new hydraulically operated press brake develops 12 tons of pressure, with a 36 in. length of bed and ram.

Circle 217 on postcard for more data

ALLIED MFG. & SALES CO.

Booth . . .

The new Grand standard telescope Lift King speeds up heavy loading and stacking. One man can safely handle loads up to 3000 lb. with hydraulic lift, powered by two standard six volt batteries this fork or platform lift stacker can lift from floor level up to 100 in. The standard telescope Lift King with eight in. roller bearing Texit wheels and stationary position locking device has been developed for easier floor or truck loading and unloading. No slings, tongs or chains are necessary. This is one of 54 models together with four models of the new shop caddy with a quarter ton capacity. Shop Caddy, Lift King and Grand C-clamps will be shown.



Allied Lift King No. 71 telescoping 100 in. lift

U.S.-BURKE MACHINE TOOL. DIV. CINCINNATI MFG. CO.

Booth 616

The following machine tools will be on display:

Number 1 U. S. hand milling machine, a production type unit. Number 4 Burke universal bench milling machine with vertical milling attachment. This unit may be either bench or pedestal mounted.

Powerfeed head U. S. vertical milling machine. This is a new, vertical and angular toolroom milling machine.

The fourth machine is a No. 2 horizontal, universal knee type milling machine with a 3 hp drive motor and infinitely variable spindle speeds. It is equipped with a turret and independently driven 1½ hp vertical milling head with powerfeed to the quill. This new type machine tool combines, in one unit, a horizontal, vertical, angular and universal milling machine. Its function will be to provide a complete milling department in one tool.

Circle 218 on postcard for more data

Automatic Balancing

...a Reality with TINIUS OLSEN ElecTdyne Balancing Machines

To meet a pressing need in the automotive industry, Olsen developed a machine for removing unbalance from crankshafts automatically. Unbalance readings are "memorized" by the machine and material is removed automatically with high speed drills. As many as 24 or more crankshafts per hour are being balanced and corrected within 0.3 ounce-inches on a production line basis, with no operator judgment involved.

Any mass-produced rotating part can be balanced automatically by applying the versatile functions of the Olsen ElecTdyne principle to the specific requirements of the product. An experienced Olsen balancing engineer will gladly discuss your balancing needs in terms of the significant savings, consistent accuracy and production speed inherent in Olsen automatic balancing equipment.

Write for a copy of Olsen Bulletin 49

1880 1955

OUR 75th ANNIVERSARY

TINIUS OLSEN TESTING MACHINE CO.

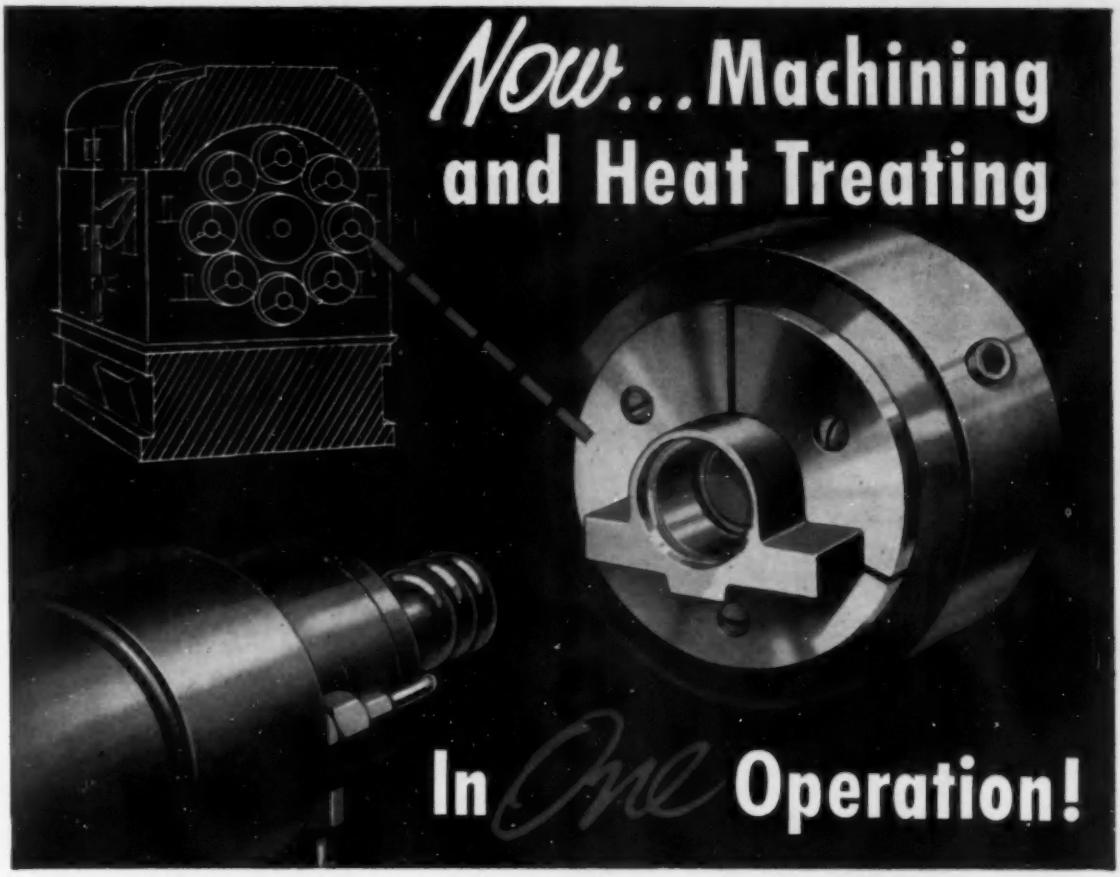
2090 Easton Road • Willow Grove, Pa.

Testing & Balancing Machines

AUTOMOTIVE INDUSTRIES . . .

is your News Magazine of Automotive and Aviation

MANUFACTURING



with TOCCO Induction Heating

Mechanics Universal Joint Division of Borg-Warner Corporation now combines automatic heat-treating and metal-working operations on the same machine!*

A Tocco Inductor Coil, matched to one spindle of a multiple spindle automatic screw machine, heat treats the inside diameter of automotive trunnion cups—after they have been completely formed on the same machine tool. Twenty-two, 20 and 50 kw, 450,000 cycle TOCCOtron Induction Heating units and 44 automatic screw machines (installed here and in other plants) make up this high-speed production team.

This new method permits the use of SAE 1144 steel and eliminates costly, time-consuming copper plating and carburizing operations formerly required. Heating and quenching cycles total approximately 10 seconds per part, and production is in excess of 300 parts per hour from each machine.

If your products or their components require heat treating, soldering, brazing or forging it will pay you to investigate TOCCO for better, faster ways of producing them at lower unit cost.

Write for free catalog—**TOCCO Induction Heating.**

THE OHIO CRANKSHAFT COMPANY
Dept. H-9, Cleveland 1, Ohio

TUTHILL SIMPLIFIES PUMP SELECTION

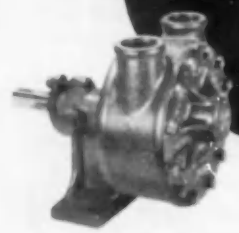
New Cataloging Plan Provides Practical Short-Cuts to Pump Specifications — Helps You Pick The Right Pump for the Purpose

If Your Specifications Call for Pumps for...

- LUBRICATION
- COOLANT
- TRANSFER
- CIRCULATING
- BURNING OILS

In capacities from 2 to 200 g.p.m. and pressures up to 300 p.s.i.

...Write for Tuthill Catalog 102



Catalog 102 offers complete data on the Model C series of rotary, internal-gear positive displacement pumps for general use in handling non-corrosive liquids with lubricating qualities.

TUTHILL

TUTHILL PUMP COMPANY

Dependable Rotary Pumps since 1927

939 East 95th Street, Chicago 19, Illinois

Canadian Affiliate: Ingersoll Machine & Tool Co., Ltd. • Ingersoll, Ontario, Canada

100 Years of Progress in Metalworking

(*Continued from page* 281)

a machine tool. When Henry D. Stone and Frederick W. Howe added an indexing tool-carrying drum to a guided longitudinal slide on the lathe bed so that a complete "kit" of end-working tools with individual stops could be successively and repetitively brought to bear on the work, they made the second big improvement in the lathe.

These "revolving head screw milling machines," as they were originally called, were introduced commercially about 1850. One of the earliest batteries of these turret lathes (which the English later called "capstan lathes") was shipped by Robbins & Lawrence to the Enfield Armory. They were tooled for rapid production of percussion cap nipples and cones for the Model 1853 British Minie rifles.

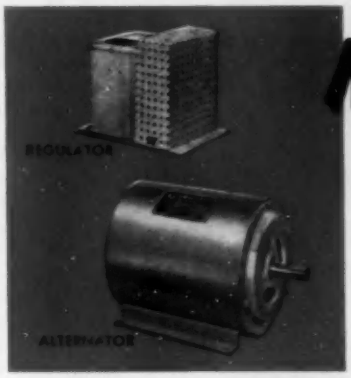
This "turret idea" caught on rapidly among American machine tool builders, among the earliest to take it up after Robbins & Lawrence being the Pratt & Whitney Co. and Brown & Sharpe. Jones & Lamson Machine Co., successors to the Robbins & Lawrence Co., always have "majored" in turret lathes. Worcester R. Warner and Ambrose Swasey chose turret lathe building as their primary ac-

MAKING INDUSTRIAL AMERICA STRONGER

tivity when they left Pratt & Whitney to go into business on their own in 1880.

The turret lathe represents transfer of skill plus a certain amount of transfer intelligence from setup man to machine. It was one of the first machines to emancipate the operator from the chore of constantly mounting and dismounting tools. When E. G. Parkhurst of Pratt & Whitney invented the collect and pusher system of bar stock feed, the operator was further relieved of the chore of manual chucking. In other words, the operator was merely an actuator—the machine furnished the "know-how" to a large extent.

The next great improvement in the lathe was made by Christopher M. Spencer of Civil War rifle fame. In 1872-73, he added a system of "brain



Now...TAKE AC POWER ANYWHERE A VEHICLE CAN GO!

MO-BIL-AC* (mobile a-c power supply) driven by vehicle engine, supplies up to 10 KW at 110-220 volts . . . . takes little space

Designed by Star-Kimble to meet the need for a compact, portable source of AC at commercial voltage and frequency, MO-BIL-AC drives a-c powered tools, pumps, compressors, hoists and similar equipment in the field . . . *wherever a self-propelled vehicle can go.*

An outstanding feature of MO-BIL-AC is its low size-weight to power output ratio. To achieve it, a 2-pole alternator is excited by a compact, lightweight regulator with a selenium rectifier and magnetic amplifier working off the alternator output.

This unique S-K development also insures excellent transient response: upon application of full load, voltage recovers in one second or less. Speed of prime mover is not critical because regulator keeps output voltage proportional to output frequency. Thus, standard motors may be operated over a wide frequency range without overheating.

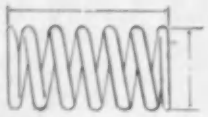
MO-BIL-AC is available in 3, 5 and 10 KW ratings, 60 cps, single and polyphase, any commercial voltage.

Write or phone for full descriptive literature.

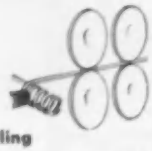
*Trade Mark applied for

Star-Kimble MOTOR DIVISION
MIEHLE PRINTING PRESS & MFG. CO.
215 Bloomfield Avenue Bloomfield, New Jersey
BLoomfield 2-8160

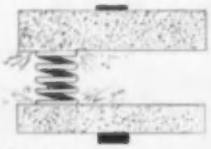
AUTOMATIC SPRING



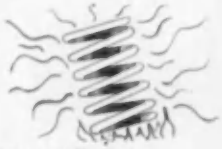
Designing



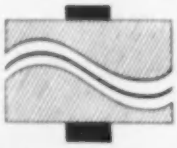
Coiling



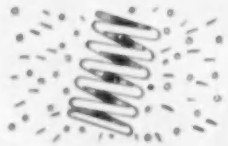
Grinding



Stress Relieving



Forming



Shot Peening

big enough • • • yet small enough

AUTOMATIC SPRING is the ideal size company to make your springs. We're big enough to have a complete range of the best modern equipment. We have a full range of spring coiling machines, a grinding department second to none, stress relieving, shot peening, multi-slide, stamping and finishing facilities, and a complete tool room. And we have the capacity to handle large runs.

But AUTOMATIC SPRING is also small enough to give your job personal attention. Top expert advice is available on your design or engineering problem. From the Production Manager right down to the operator, everyone knows your job and what is wanted. And when you need shipping information, it is available immediately.

So we feel safe in boasting that AUTOMATIC SPRING gives personalized attention. We are big enough—yet small enough!

Send for new illustrated brochure, giving information for specifying springs and other data.

for quality springs "Automatically" think of

AUTOMATIC SPRING COILING CO.

4058 West Thorndale Ave., Chicago 30, Ill.

wheels" to a Pratt & Whitney turret lathe and made it self acting. This was the beginning of the era of the automatic machine tool and also foreshadowed our present era of "automation."

The "brain wheels" of Spencer's automatic screw machine—through the medium of changeable cams designed and set for each individual run of work—actuated stock feed and chucking, cross slides and turret and cutting-off tool. Relieved of all these chores, the operator became primarily a supervisor and could supervise the activities of as many as five or six automatics at once.

From 1872 until his death in 1922, at the age of 89, Mr. Spencer made

MAKING INDUSTRIAL AMERICA STRONGER

automatics his primary interest. He invented the multiple-spindle machine which became the New Britain automatic after he became mechanical engineer of the New Britain Machine Co. Among his associates at one time or another were Edwin C. Henn, inventor of the multiple-spindle Acme automatic and a founder of The National Acme Co., and George O. Gridley, inventor of the Gridley single and multiple spindle automatics.

Neither the turret lathe nor the automatic put the conventional type of lathe out of business. Of late years there has been a strong trend in the engine lathe field toward systems of automaticity which can be turned on or off as required. Among these are shape-generating systems by means of which forms other than circular can be machined—glass molds for example.

Other systems—and many of them will be in evidence at the Machine Tool Show in Chicago—permit accurate contour machining under control of templets or prototype work pieces. Still others permit multi-diameter turning of repetitive work through program control of multiple tools by electrical or electronic means. Some of these machines are capable of giving conventional automatics a lively run for the money.

Program control also has become an important factor in turret lathe operation, through provisions for preselected speeds and feeds; also through various methods for self-actuation of slides. These methods in-

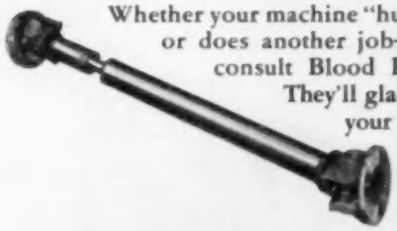
(*Turn to page* 315, *please*)

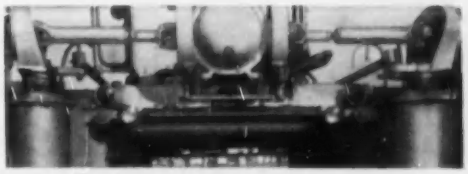
Year after year, ROSS Carriers HUSTLE THE HEAVIEST LOADS with power transmitted through

BLOOD BROTHERS Universal Joints

Known to users as the "one-truck fleet", Ross Carriers are just too versatile—and too profitable—to be left standing idle. To help keep them on the job around the clock, Ross engineers have demanded the utmost dependability of every carrier component. It is significant that Blood Brothers Drive Lines have been specified by Ross to "get the power through" for over 25 years.

Whether your machine "hustles heavy loads"—or does another job—it may pay you to consult Blood Brothers' engineers. They'll gladly work with you on your drive line problems.





BLOOD BROTHERS MACHINE DIVISION

ROCKWELL SPRING AND AXLE COMPANY

ALLEGAN, MICHIGAN

UNIVERSAL JOINTS AND DRIVE LINE ASSEMBLIES

PRODUCTION ENGINEERING SHOW

(*Continued from page 218*)

DE VILBISS CO.

Booth 155-6

The compressor PJE-521 when powered by a gasoline engine, and PJ-521 when electric motor driven, is a compact, portable unit for use by contract painters, homeowners, farmers and small shops.

Rated at ½ hp, it will deliver air at the right pressure for spray painting and other low pressure uses. The air reservoir and condensation chamber also serve as carrying handles for the relatively lightweight unit.

In operation the complete unit rests on the rubber tired wheels and two rubber padded feet provide a firm foundation.

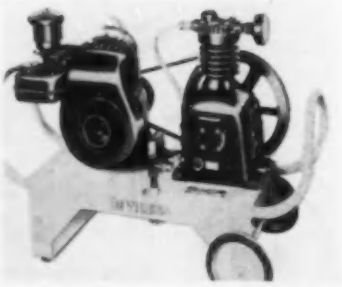
The paint heating system utilizes hot water and is designed for large or small painting operations. To simplify the system the unit contains only one moving part, a pump for circulating hot water.

DeVilbiss paint heater installation

Material to be sprayed is heated in a heat transfer unit located near the spray station. The paint cannot become overheated. To assure heated material at the point of usage, the system has a jacketed hose from the heat exchanger to the spray gun.

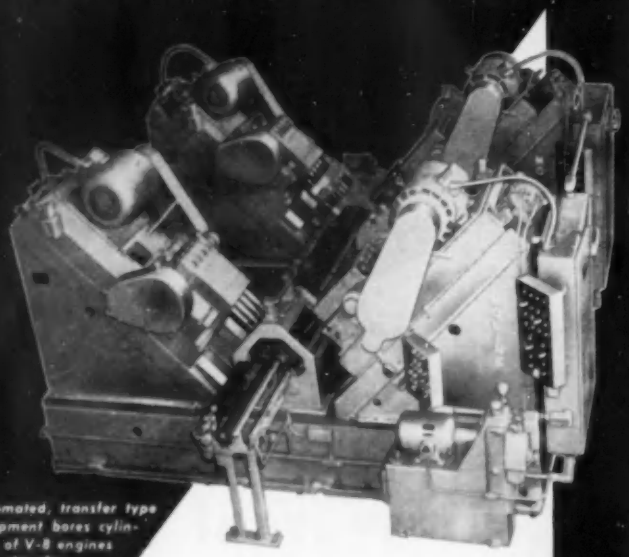
Water for the system is heated in a separate unit. One water heater will handle several heat exchangers located at different points. Each spray station must have a heat exchanger for each color which is to be sprayed at that station.

Material to be sprayed is supplied the heater in the conventional manner. It may be placed in a pressure paint tank or circulated through a circulating system. The hot water pump is of the axial flow, magnetic type. It is completely sealed and becomes an



DeVilbiss light air compressor

For Greater...
PRODUCTION • EFFICIENCY • SAVINGS



Automated, transfer type equipment bores cylinders of V-8 engines and chamfers both ends of bores.

Use an individually designed "Hole-Hog" Machine Tool for such jobs as:

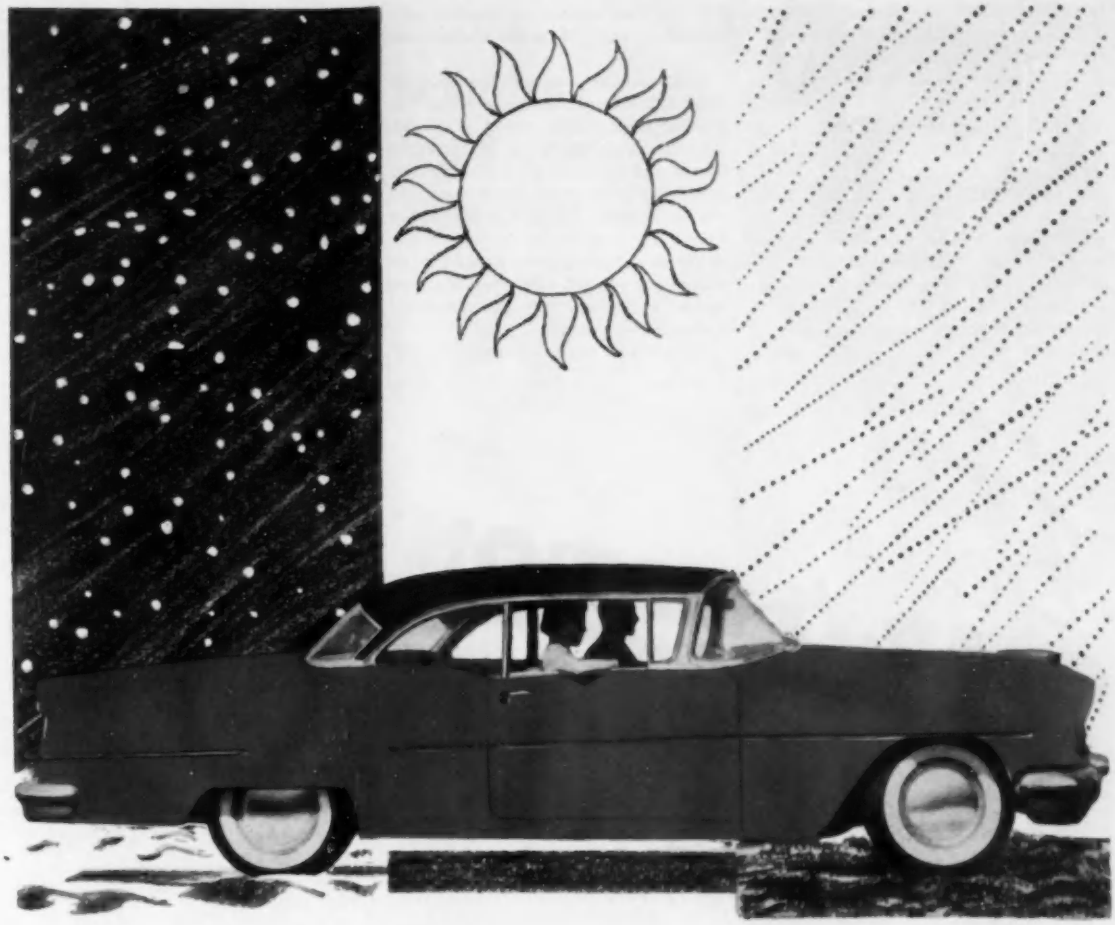
- Multi-Spindle Boring
- Single and Multi-Spindle Honing
- Straight Line Multi-Drilling
- Adjustable Spindle Drilling
- Vertical and Way-Type Fixed Center Drilling, Boring and Tapping
- Special Multiple Operation Machine Tools

Over 50 years of Machine Tool Engineering experience is at your service. Tell us your particular problem.

Representatives in principal cities.

MOLINE TOOL CO. HOLE-HOG MOLINE, ILLINOIS

MOLINE TOOL COMPANY
100 20TH STREET MOLINE, ILLINOIS



100 parts made from Enjay Butyl give all-weather protection to new cars

In many new models, extended "new car performance" is assured in over 100 places by parts made from Enjay Butyl. This super-durable rubber has many advantages that make it amazingly resistant to the deteriorating elements that cause the early failure of most types of rubber. Its price and ready availability are advantages, too.

Enjay Butyl is now available in *new* non-staining grades for white and light-colored automotive parts. For full information and for technical assistance in the uses of Enjay Butyl, contact the Enjay Company today.

ENJAY BUTYL

Enjay Butyl is the super-durable rubber with *outstanding* resistance to aging • abrasion • tear • chipping • cracking • ozone and corona • chemicals • gases • heat • cold • sunlight • moisture

ENJAY **ENJAY COMPANY, INC.,** 15 West 51st Street, New York 19, N. Y.
District Office: 11 South Portage Path, Akron 3, Ohio.

35 SUCCESSFUL YEARS OF LEADERSHIP IN SERVING INDUSTRY

integral part of the piping system. There are no packings or bearings requiring lubrication.

Circle 153 on postcard for more data

SCHAUER MFG. CORP.

Booth 245

A new type of speed lathe, designed to accomplish a specific production requirement, will be featured. It has been built with the pedestal inclined 20 deg to provide convenience of operation. The work, held by a collet, is completely enclosed by a safety cover, contoured to the shape of the work. The machine cannot be started until the safety cover is in the closed position.

Operation sequence of the machine is as follows: Work is placed on the holding fixture and guard is closed. The operator actuates the control button and the part is rotated at slow speed for a predetermined time. At the completion of the slow speed time, the machine automatically shifts to a high spindle speed for an additional pre-set time period, then stops. The operator lifts the guard and removes the work.

The work performed is the deburring and polishing of a small metal part. The inset in the illustration shows the safety guard opened, exposing the work-holding fixture. The door on the pedestal is shown removed to provide a view of the motor, control switch and timing device, all readily accessible for maintenance. Speed lathes of this type also can be provided with chuck-type holding fixtures.

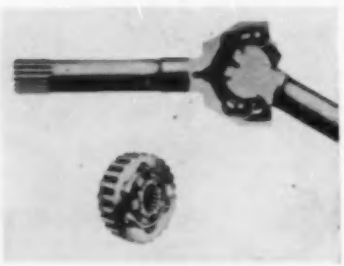
Schauer speed lathe

Circle 154 on postcard for more data

GEAR GRINDING MACHINE CO.

Booth 511

The line of Rzeppa constant velocity universal joints and the line of Almetal universal joints and industrial gears will be demonstrated. The latter two are produced by the Detroit Bevel Gear Co., a subsidiary of this



Gear Grinding Mach. Co. Rzeppa ball type joint and disk type joint.

—or, if you prefer, let us tell you the whole story right now—the story of how you can produce more gears and better gears—more splines and better splines—in less time—at lower cost.

Gear-O-Mation* will be shown in operation at the Machine Tool Show. All units are now in production and have been production-tested.

*Trademark

MICHIGAN TOOL Company

7171 E. McNICHOLS RD. • DETROIT 12, MICHIGAN, U. S. A.
IN CANADA: COLONIAL TOOL CO., LTD.

company. The principles of constant rotating motion, as applied to both the bell and disk type joints, will be demonstrated. Applications of these joints are said to range from automatic pin setters to earthmoving equipment. Of special interest will be the new miniature joints, which can be made as small as 2⅛ in. long.

Circle 155 on postcard for more data

IMPERIAL STAMP & ENGRAVING CO.

Booth 825

Imperial Stamp & Engraving Co. will have a complete line of hydraulic marking machines with high speed automatic fixtures in operation.

The standard No. 110 heavy duty hydraulic marking machine, with a capacity of 3600 parts per hour, will be equipped with a fixture for marking round parts automatically.

The new model No. 115 light weight hydraulic marking will be exhibited for the first time. This machine has

Imperial heavy duty hydraulic marking machine

a stroke of five inches and is capable of speeds up to 150 one-inch strokes per minute. It provides all the features of the No. 110 hydraulic marking machine for light or medium operations. Both units are universal machines for marking flat, round or irregular shapes.

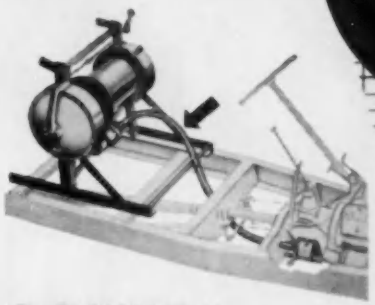
Also included will be exhibits of flat and roll stamps, holders for marking on automatic screw machines, automatic numbering heads and other marking equipment.

Circle 156 on postcard for more data

(*Turn to page 306, please*)

In driving this 3½ ton drum crane

S.S.White FIRST NAME IN Flexible Shafts



S.S.WHITE FLEXIBLE SHAFTS prove their ability to handle the big jobs

Operating from a take-off on a truck transmission, a rugged ¾" S.S.White power drive flexible shaft drives the clutch which operates this drum crane. Not only does the shaft transmit a substantial amount of power but it offers a compactness and adaptability not usually found in most mechanical elements.

When power drives or remote controls are in the picture, it will pay you to consult S.S.White FIRST and find out what a flexible shaft can do for you.

Flexible shaft information for you...

Bulletin 5306 has basic information and data on selection and application. Send for a copy. Address Dept. B.

S.S.WHITE INDUSTRIAL DIVISION
10 East 40th Street, New York 16, N. Y.

S.S.White FIRST NAME IN FLEXIBLE SHAFTS

P-7A

Accuracy ±.000008"
$320.00
84 BLOCK SET
For years Webber has dedicated itself to the production of gage blocks at a price that even the smallest shop can afford.
Quality and precision have not been compromised in this undertaking. Ask those who use them. Write for literature.
H. D. BLOCKS and FIXTURES
STANDARD STEEL BLOCKS
CROBLOX CARBIDE
ANGLE BLOCKS
Webber
GAGE COMPANY
12918 TRISKETT ROAD
CLEVELAND 11, OHIO
LARGEST EXCLUSIVE MANUFACTURER OF PRECISION GAGE BLOCKS

PRODUCTION ENGINEERING SHOW

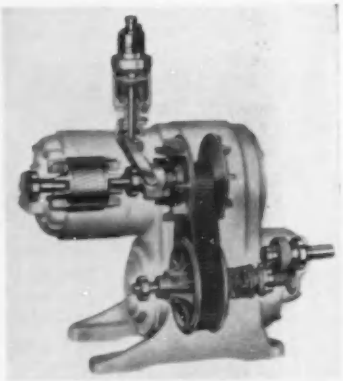
(*Continued from page* 305)

U. S. ELECTRICAL MOTORS, INC.

Booths 815-16

In addition to a complete line of motors, including the U. S. Uniclosed, Syncrogear, Varidrive and totally enclosed motors, the new Varitrol control for U. S. Varidrive motors will be featured. This new control is an automatic type pneumatic control, which may be adapted to a variety of signals as an important component in the automation field.

Speeds from 2 rpm to 10,000 rpm are obtainable in ratios up to 10 to 1,



Phantom view of U.S. Varidrive motor with Varitol automatic, pneumatic control.

while motor is running. A control handle regulates the speed of the driving shaft to any speed. Available in horizontal and upright designs, every U. S. Varidrive motor incorporates the "Autotaut" belt tensioner, ball bearings throughout and dynamically balanced Varidiscs. Ratings are from ¼ hp to 50 hp, with built-in gearing to provide any desired output speed.

Circle 157 on postcard for more data

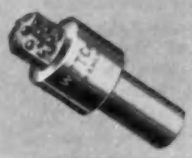
ELECTRO DYNAMIC DIV. GENERAL DYNAMICS CORP.

Booth 341

There will be an exhibit of standard polyphase a-c motors, drip-proof, totally enclosed—fan cooled, and explosion-proof. The new NEMA re-

RADIUS FORMING TOOLS

"TRU-LINE" PROFILE DRESSING TOOLS



IMPREGNATED DRESSING TOOLS

STANDARD DRESSING TOOLS

"TRU-THREAD" THREAD DRESSING TOOLS

DIAMOND GRIT TOOLS FOR THREAD DRESSING

INDUSTRIAL DIAMONDS

in the American tradition

Twice a day a quick transformation overtook the old frame garage on John R Street, Detroit. At seven in the morning, the doors swung open, a spindly car chugged out and the garage became a busy little workshop. Sometime after dark, the car was driven back in and, for a few hours, the workshop was a garage again.

As a workshop, it had for us a very special significance—it was here that our Company came into being and set up the first local shop devoted exclusively to making industrial diamond tools.

But, far more important, it was the first place in the whole mid-west where industry could find a complete stock of fine industrial diamonds, imported direct to Detroit, and superior to stocks previously available only in New York.

Such convenience is taken for granted nowadays and the mails deliver thousands of our diamond selections yearly, but, in those days, it was an innovation and so useful that in almost no time at all, the old frame garage (which had cost $50.00) needed a 12-foot addition, (which cost another $50.00).

And, that was but the beginning. Today, our plants are the most modern in the industry and in the intervening 45 years our laboratories have pioneered many of the most significant innovations in diamond tool technology, including *Engineered Diamond Tools**.

Thus, in the good American tradition, a far-seeing idea, planted in the humblest beginnings, blossomed into a business that became national and international. And, this year, as we celebrate our 45th anniversary, we salute all of the many friends who helped to bring about this accomplishment.

**Engineered Diamond Tools* are diamond tools *engineered* to the job and *guaranteed* to do it.

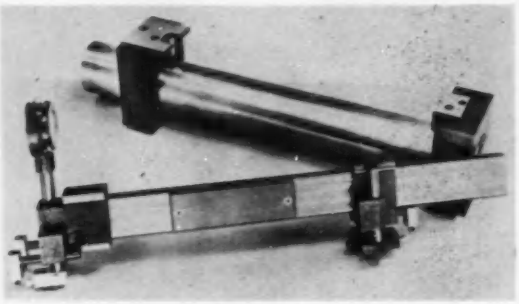
WHEEL TRUEING TOOL COMPANY
73-3200 W. DAVISON AVE., DETROIT 38, MICHIGAN
ESTABLISHED 1910
Southwestern Plant: Dallas, Texas
Distributors in Principal U.S. Cities—Agents Throughout the World
WHEEL TRUEING TOOL COMPANY OF NEW JERSEY
33 West Street, Bloomfield, N. J.
WHEEL TRUEING TOOL COMPANY OF CALIFORNIA
5360 Alhambra Ave., Los Angeles 32, California
WHEEL TRUEING TOOL COMPANY OF CANADA, LTD.
575 Langlois Ave., Windsor, Ont.

rated motors will be on display.

The newest product will be a "Selectrol" electronic variable speed drive, a new versatile means of obtaining infinitely variable speeds, controlled by fingertip manual control, or by automatic control from a machine function such as tension, position, linear or angular precision speed, etc.

Also on exhibit will be the new Gear-ED-Motors and Any-Motor gear reducers.

Circle 158 on postcard for more data



Boice Model 985 adjustable diameter gage

Boice dial gage Setmaster

BOICE MFG. CO.

Booth 826

The dial snap gage Setmaster will be shown. It is a functional instrument that can quickly be set to an exact setting, which then is used to check the dial indicator gage. Due to the fact that it is readily adjustable, it is claimed to be ideal for prototype work, short run production, receiving inspection, emergency tooling, process dimensions and final inspection. It allows quality control to be used on jobs that normally are checked only by fixed gages, due to the lack of a complete indicator gage setup, gage and master.

The Setmaster comes in companion units to the Boice dial snap gage. It is set by transferring the dimensions from jo blocks and also serves as a stand for the gage.

The long-range inside and outside diameter gage, Model 985 is fully adjustable. By interchanging the tubing center sections inside or outside, diameters from 6 to 48 in. can be measured. This gage sits on the work surface on rest buttons with one inch of adjustment. The gaging depth is adjustable to two in. and greater depths. Various rests, gaging tips and indicators are available.

A companion unit to this adjustable gage, is the Model 10,300 Adjustable Master. This utilizes the removable center sections for different diameter work. It has hardened rest plates, and a quick adjusting anvil.

Circle 159 on postcard for more data

SCULLY-JONES & CO.

Booth 164

New and improved Safe-Torque tap drivers will be demonstrated in a drill press, doing bottom tapping with ⅜-16 hand tap, 1800 rpm, as well as Safe-Torque nut runners in air and electric power tools. Toolitrol board and pre-setting tools—a new method for controlling at-the-machine problems of pre-setting,

EATON

EATON STOPS RUST... CUTS PACKAGING TIME 30% with ORCHARD VPI

Eaton Manufacturing Company, Cleveland, Ohio uses Orchard VPI to prevent rust on axle replacement parts. Eaton reports, *"We save 30% in packaging time with Orchard VPI Paper"*. The illustrations at right show Eaton gears and pinions preserved with a single wrap of Orchard VPI; a 6 year test conclusively proved Orchard VPI's lasting qualities for protection against rust.

Write For Free VPI Sample Kit No Obligation

Orchard VPI gives off an invisible vapor that stops rust on all ferrous metal parts. It is economical for packaging, for shipping and for storage. It saves time, delivers parts in resalable condition and is easy to use! Orchard VPI is available in sheets, rolls, bags and shrouds — all shapes and sizes to fit your needs.

ORCHARD PAPER CO., Dept. A53
3914 N. Union, St. Louis 15, Mo.
Please send us the Orchard VPI Sample Kit.
Firm .....
Requested by .....
Address .....
City & State .....

FREE TO TRADE ORCHARD PAPER COMPANY

ORCHARD PAPER CO.
3914 N. UNION ST. LOUIS 15, MO.
Offices in: Atlanta • Chicago • Cleveland • Dallas Indianapolis • Kansas City • Los Angeles • New York • Syracuse

storing and changing tools, in addition to new torque meters and flow meters will also be shown.

Other new products on exhibit will be recessing tools, cam type tool ejectors, drill chucks, center drill drivers, heavy duty tap holders, close center tap drivers and chucks, JT lock and eject type compression and tension tap holders, new drill stops, new JT lock and eject type adjustable adapter assemblies, improved milling machine arbors with new end collar and adjustable spacing collar, Roll-Lock and Better-Hold mandrels, arbors and chucks, JT lock and eject type floating holders.

Circle 160 on postcard for more data

VASCOLOY-RAMET CORP.

Booths 246-7

A new tool holder for Throw-away cemented carbide inserts, incorporating a six deg positive side rake, will be introduced. Initial production will be limited to the more popular shank sizes and styles for straight turning (TAPR), and 15 deg lead angle turning (TBPR), but production plans call for a complete series of shank sizes and standard styles, already being used in the negative style toolholders. Both new styles are designed to the same general specifications and dimensions found in the style A (straight turning) and style B (15 deg lead angle turning) brazed shank tools.

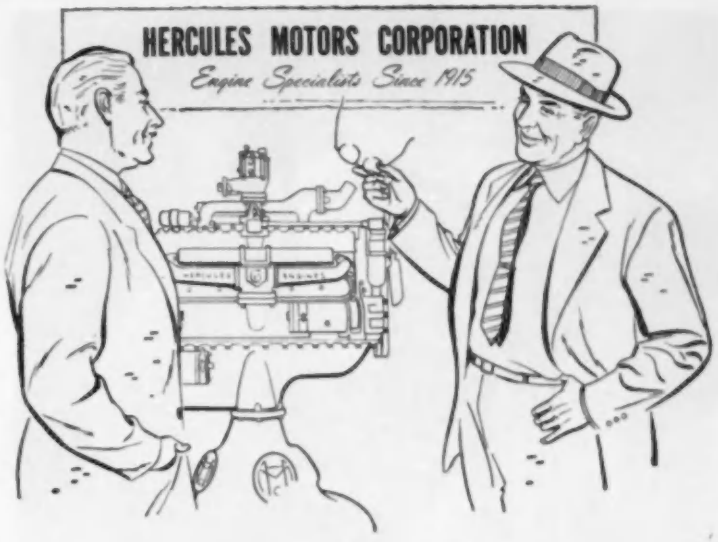
The company now offers a new development in tool holder design for machining metals and materials, requiring the use of positive rake tool design—aluminum, soft brass, copper, bronze, stainless steel, alloyed steels, plastics and other materials.

Incorporated in this tool holder is a new cast-alloy chip breaker plate with unusually high resistance to abrasive wear. The addition of this new plate eliminates the necessity for grinding chip breakers in the cemented carbide insert. The new chip breaker plate is available in two styles—a standard plate incorporating a chipbreaking width which meets standard practice, and a blank plate which may be ground with standard grinding wheels to fit individual machining problems.

On display will be a complete line of both positive and negative rake tool holders, inserts, wire and drawing dies, standard tools and blanks, Tantung, investment castings and mining tools.

Circle 161 on postcard for more data

(*Turn to page* 310, *please*)



It May Cost a Little More to Buy the Best

But **HERCULES ENGINES give you**

So Much More **for your money.**

● (1) Long-life service . . . not just an idle statement. Many HERCULES ENGINES 5, 10, and 15 years old are still delivering dependable day-in, day-out power. (2) Engines designed to-the-application . . . granted, we have over 90 standard models but they are not off-the-shelf items. HERCULES ENGINES are custom-produced to specifications of the equipment. (3) Gasoline or Diesel . . . many models of gasoline engines have similar mounting dimensions as diesel engines of like displacement. (4) Wide selection of fuels . . . HERCULES ENGINES operate efficiently on any popular fuel available, permitting the use of the most economical fuel in your area . . . gasoline, diesel fuel, natural gas, kerosene, L.P.G. and others. (5) Lightweight, heavy-duty construction . . . the excess metal that adds to engine weight has been eliminated . . . all 6 cyl. engines have 7 bearing Tocco hardened crankshafts, large precision-type bearings and full length water jackets are some of the extras which are standard on HERCULES ENGINES.

These are but a few of the features that make HERCULES ENGINES a better buy. For more complete information on the wide selection of Hercules Engines and Power Units, write for a copy of the folder, "Hercules Engines." This lists the many sizes of engines and their power ratings.

HERCULES ENGINES

HERCULES MOTORS CORPORATION

40 Years of Engines for Industry

103 Eleventh Street, S. E. • Canton, Ohio

HOW FEDERAL HELPS
BINGHAM-HER BRAND
BUILD BETTER ASSEMBLIES

Bingham-Her brand, Toledo, O., is one of the nation's foremost suppliers of fabricated parts and assemblies for the automotive and appliance industries. To maintain constant high quality, yet keep their prices competitive they must continually work at controlling their costs.

It's this cost consciousness that has brought them to rely on Federal Resistance Welders. Their records show they get more production at less cost from Federal equipment.

Bingham-Her brand is not alone in this respect . . . for wherever resistance welding units are a major operation and costs are important, you'll find machines by *Federal — First in Resistance Welding.*

Before and after shots of a power unit case for appliance application.
Fifteen separate parts are welded together to make a completed unit.

Federal WELDERS

Warco PRESSES

THE FEDERAL MACHINE AND WELDER CO.
WARREN, OHIO

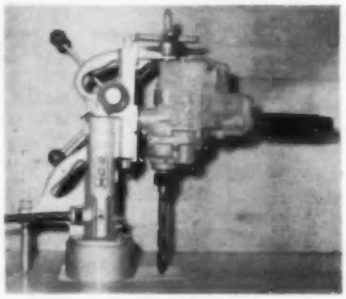
PRODUCTION ENGINEERING SHOW

(Continued from page 309)

BUCK MFG. CO.

Booth 141

The Bux magnetic drill press will be on display. Its operation is primarily the same as any drill press (hand fed). Its magnetic base firmly holds the press in place, and ample drilling pressure is obtained with minimum effort by the operator by means of a rack and pinion feed. The handle at the top is so placed that the tool is in balance when carried in a vertical position, while the lower handle is placed so that the tool will balance in a horizontal position. It is designed for convenient drilling, reaming, tapping and countersinking of structural shapes, bar stock, machinery, jigs and fixtures.



"Bux" magnetic drill press

Circle 162 on postcard for more data

NELSON STUD WELDING DIV. GREGORY INDUSTRIES

Booth 454

Versatility of stud welding fastening techniques will be demonstrated. Mass production applications of this fastening technique, such as on automobile axles and air-conditioning compressor housings, will be featured. Two demonstration units will be in action, one setup to illustrate how stud welding can be performed with drill press precision, while a second stud welding gun will be operated as a portable unit to illustrate how the tool is taken to the work. The new NS-9 stud welding gun, capable of end-welding studs up to 1¼ in. dia. will be used in the demonstrations.

Circle 163 on postcard for more data

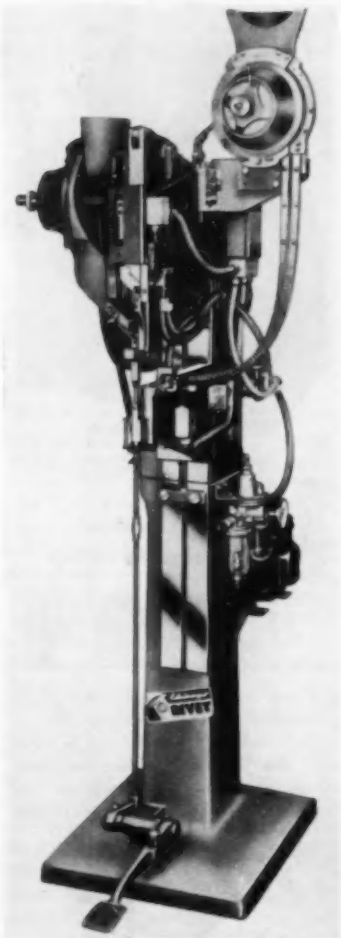
CHICAGO RIVET & MACHINE CO.

Booth 147

A newly designed automatic riveter for simultaneously setting a solid and a tubular compression type of rivet, will be exhibited. In this machine two rotary type rivet hoppers are used to feed both solid and tubular rivets. The solid rivet drops by gravity in the raceway to riveting position. The tubular rivet is fed to the pneumatically operated traverse slide which accurately positions the rivet directly below the solid rivet. Parts to be riveted are loaded on the tubular rivet. When the machine is operated, both rivets are wedged together in a single operation.

Circle 164 on postcard for more data

(*Turn to page* 312, *please*)



Chicago Rivet & Mach. Co. automatic riveter

OFTEN:

TWO HEADS ARE BETTER THAN ONE

Sometimes a double head is the only solution to your part or fastener problem. This steel spacer is an excellent example of a single double-headed part that has replaced a more expensive 3 piece part. Not only was the spacer itself much less expensive but actual assembly cost was cut almost 30%. HASSALL double-heading really paid off on this one.

Double-heading is only one example of the almost limitless possibilities Hassall cold-heading offers you. If you have a fastener problem just send us samples or specifications for a quotation.

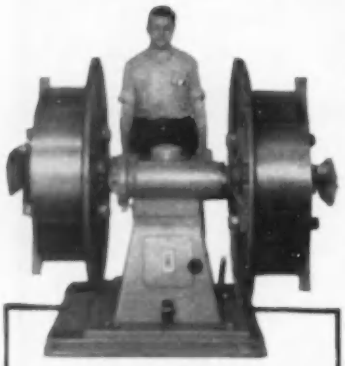
WRITE FOR CATALOG . . . . . with it we will send you our popular decimal equivalent wall chart. John Hassall, Inc., Box 2194, Westbury, L. I., N. Y.

HASSALL

SINCE 1850 — Hassall — NAILS, RIVETS, SCREWS AND OTHER COLD HEADED FASTENERS AND SPECIALTIES

for continuous AUTOMATION

LITTELL Double Automatic Centering Reels



Production continues while you reload one side of this Littell No. 25-12 Double Reel. When one coil is used up the reserve coil swivels into feeding position in a matter of seconds. The idle side is reloaded while the working side pays out. Electric Brake with rheostat controls provide an adjustable spindle drag. The Reel Pedestal, mounted on a machined base plate, permits accurate line-up with the center of the die. No. 25-12 takes a 2500 pound coil on each side, and is one of the many Littell Automatic Centering Reels perfectly adapted to pressroom automation.

Write for the Littell Reel Catalog

Ask for your coil weight calculator

F. J. LITTELL MACHINE CO.

4107 N. Ravenswood Ave., Chicago 13, Ill.

PRODUCTION ENGINEERING SHOW

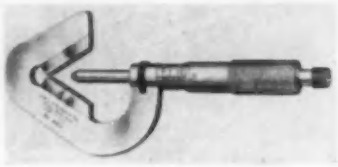
(*Continued from page* 311)

THE L. S. STARRETT CO.

Booths 144-5

A comprehensive display of the more than 3000 items manufactured will be shown. The new No. 167 series radius gages make available five gaging surfaces on each gage for convex and concave radii. Individual gages permit every gage to be used separately for greatest accuracy and convenience. Available in four different sets covering the range of 1/64 to ½ in. by 32nds or 64ths. Made of rustproof stainless steel.

The new No. 253 dial indicator set provides in one compact kit a complete range of dial indicators which



Starrett Micrometer for measuring odd flutes

will handle most gaging jobs for tool and die shops, machine shops and inspection departments where a heavy investment in dial indicators is not justified. Set contains three Hi-Precision low-friction indicators, selected from the new line of Starrett dial indicators — a No. 25-111, graduated 0.0001 in., reading 0-5-0, range 0.025 in.; a No. 25-131 indicator, graduated 0.0005 in., reading 0-25-0, range 0.125 in.; and a No. 25-441, graduated 0.001 in., reading 0-100, range 1.000 in., in mahogany case.

A new micrometer for measuring odd flutes isspecifically designed for measuring odd-fluted taps, milling cutters reamers, etc. Used like a conventional outside micrometer, it permits of direct readings in thousandths of an inch. Available in models; No. 483 with V-anvil designed to accommodate cutters with three flutes, and No. 485 for cutters with five flutes.

Circle 165 on postcard for more data

DETROIT BEVEL GEAR CO.

Booth 511

A complete line of Almetal universal joints and gears will be ex-

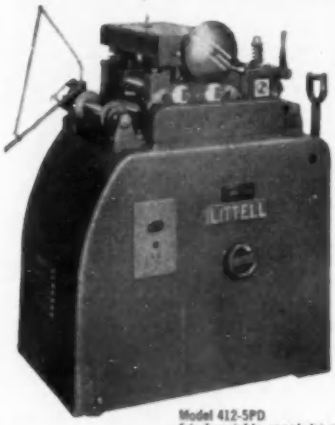
for AUTOMATION on slitter, shear or punch press

coil stock

converted to workable

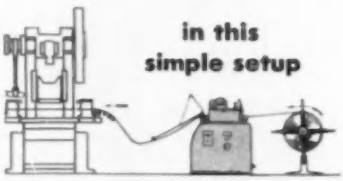
flat stock

by a LITTELL Variable Speed Straightener



Model 412-5PD
5 to 1 variable speed drive
Straightens steel stock up to .125" thick x 12" wide.

in this simple setup

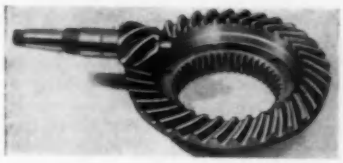


Coil stock comes out of a Littell Straightener commercially flat, in perfect condition for accurate, automatic, high speed work on punch press, shear or slitter. The right straightener for your requirements is in the complete Littell line. *Write for the Littell Straightener Catalog*

F. J. LITTELL MACHINE CO.

4107 N. Ravenswood Ave., Chicago 13

hibited. Models range from very light power take-off work to heavy duty roadbuilding equipment. In addition to applications in the automotive, industrial and agricultural fields, many other applications will be seen. The gear exhibit will consist of typical spur, helical, spiral bevel, hypoid,



A spiral bevel ring gear and pinions set for heavy duty trucks.

Almetal propeller shaft assembly with needle bearings.

straight bevel, Zerol and flywheel ring gear types. As manufacturers of precision industrial gearing, the company also supplies axle and spline shafts for the automotive, agricultural and industrial fields.

Circle 166 on postcard for more data

CUSHMAN CHUCK CO.

Booth 419-21

The Cushman Accra-Set chuck has been designed for minute accuracy which must be held to close limits. Adjustment is simple, quick, and the chuck will repeat to 0.0005 in. or better total indicator reading.

The adjusting mechanism of the Accra-Set chuck consists of four adjusting screws, equally spaced about the periphery of the chuck body and placed on a compound angle. The screws always make full end face contact with hardened steel balls, which have one flat plane to provide face contact and are free to find their own pivotal position in the rigidly mounted back plate of the chuck. Adjustment of the screws against the balls shifts the chuck body carrying the jaws, scroll, and pinion to dead center and at the same time draws the body solidly against the back plate, as well as positively locking it against rotational slippage. Thus, the body is rigidly and centrally positioned with no slippage or shifting during heavy interrupted cuts, sudden stops and starts of the machine spindle, or in its use on indexing devices.

Circle 167 on postcard for more data

(*Turn to page* 314, *please*)

Here's What Users Have to Say About—
MARVEL Synclinal FILTERS

SUMP TYPE (Cutaway)

LINE TYPE (Cutaway)

U. S. STEEL CO., Irvin Works Three-Stand Cold Reduction Mill—"Marvel Synclinal Filters are a part of the mill's main hydraulic system which operates Coil Cradle as well as other hydraulic machines".

JONES & LAUGHLIN STEEL CORP., Aliquippa Works—"Marvel Synclinal Filters proved their effectiveness when one of the motors on the hydrostatic pipe testers broke down. A brass fitting was chewed up and jagged pieces of brass were carried into the oil stream. Any small piece of brass could also have caused a great deal of damage to the expensive equipment. However, when the unit was inspected, it was found that all metal particles had been filtered out by the Marvel Synclinal Filters and no damage had been done to the equipment nor was there any loss in operating time. Two filters are installed on each circuit so that one can serve as a by-pass while the other is being cleaned. Although it takes only about fifteen minutes to clean the monel filter insert, even this short interruption in production could be costly in an operation of this size".

Many others reporting similar results are now specifying **MARVEL SYNCLINAL FILTERS** on all new hydraulic equipment—and Standardizing with **MARVEL SYNCLINAL FILTERS** on all existing equipment.

For Dependable Protection on All Hydraulic and Other Low Pressure Circulating Systems

Investigate
MARVEL SYNCLINAL FILTERS
They Meet J. I. C. Standards

FILTERS FOR ALL TYPES OF FIRE-RESISTANT FLUIDS
Marvel's most recent development is a filter for the efficient filtration of all types of fire-resistant fluids.

WATER FILTERS
Both sump and line type filters have been adapted for use in all water filtering applications. No changes have been made in the basic, balanced, synclinal design.

A SIZE FOR EVERY NEED
Available for sump or line installation in capacities from 5 to 100 G.P.M. Greater capacities may be attained by multiple installation (as described in catalog). Choice of monel mesh sizes range from coarse 30 to fine 200.

IMMEDIATE DELIVERY!
As in the past, Marvel continues to offer Immediate Delivery!

See Our Exhibit at the
PRODUCTION ENGINEERING SHOW
Booth #809
Navy Pier—Chicago, Ill.
SEPTEMBER 6-16, Incl.

See Marvel Synclinal Filters in ACTION!

See Why—OVER 600 Original Equipment Manufacturers are installing them as Standard Equipment!

Catalogs containing complete data available on request

MARVEL ENGINEERING COMPANY
625 W. Jackson Blvd., Chicago 6, Ill.
Phones: FRANKLIN 2-3530 & FRANKLIN 2-4431

Without obligation, please send me complete data on Marvel Synclinal Filters, as indicated:
- ☐ Catalog #100—For Hydraulic Oils, Coolants and Lubricants
- ☐ Catalog #300—For WATER
- ☐ Data on filters for Fire-resistant hydraulic fluids.

Name .....
Title .....
Company .....
Address .....
City .....
State .....

AI-9

GET MORE OUT OF ANY MACHINE

CHECKS SPEED *Periodically*

SHOWS SPEED *Continuously*

BY USING **JONES TACHOMETERS**

How can you get the most from your machinery without sacrificing the quality of your product? A **JONES TACHOMETER** will give you the answer in RPM's, FPM's, etc. JONES TACHOMETERS are used widely in every type of industry to check and maintain best performance of operating equipment. Both Portable (as illustrated) and permanently installed types are available at surprisingly moderate cost.

• *WRITE FOR BULLETIN 146-G* •

JONES MOTROLA CORP.
Stamford, Conn.

Sesco **CENTERING REEL**

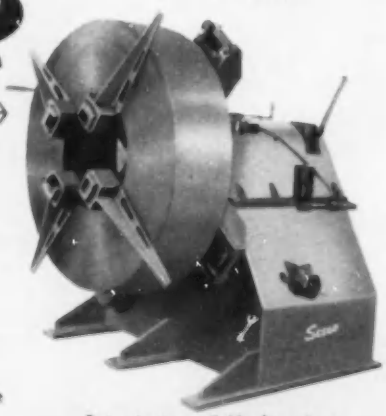
A REEL THAT LEADS THE PARADE

Completely Powered

Simplified Loading

No Adapters

Floor Space Saver



The variation of inside and outside diameters of coils is a press room and handling problem.— The Sesco Centering Reel is of rugged construction and designed to overcome this problem.

Data sheets available for gripper feeds, cradles, straighteners and reels.

Sesco INC. 8881 Central Detroit 4, Mich.

engineers & manufacturers of machine tools and press room equipment

PRODUCTION ENGINEERING SHOW

(*Continued from page* 313)

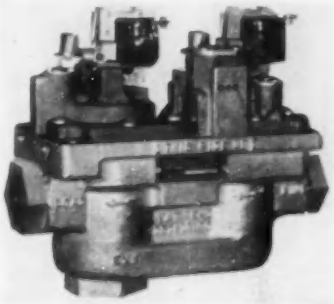
CLARK CONTROLLER CO.

Booth 840

A new pilot operated magnetic air valve, the type PV, with an operating unit and a standby safety unit will be shown for the first time.

Under normal conditions, the operating unit controls air flow to the press clutch, brake, or combination clutch and brake. The safety unit stands by, operating to cut off pressure and exhaust air from the load if the operating unit fails. Since, unlike dual-valve systems, the safety unit operates only if needed, it is not subject to the wear and fatigue of operating every cycle. Thus the possibility of simultaneous failure of both operating and safety units is practically eliminated.

The new Type PV protector valve can be installed on existing presses and operated by existing control devices. Once installed, the casing becomes a permanent part of the air piping, and it is not necessary to disturb piping to remove the operating parts of the valve for maintenance.



Clark Controller Co. magnetic amplifier packaged speed control

Magnetic amplifier packaged speed control, with no electronic tubes or moving parts, will also be on display.

The device is a full-wave, self-saturating magnetic amplifier, with standard speed control range of 10:1. The use of full-wave conversion allows the use of a motor size one frame size smaller than that required for half-wave units, since there is less heating on full-wave applications.

The 6520 speed control is completely self-contained, including field supply, control circuit, short circuit and overload protection, and operates on 110 volt, 60 cycle current.

Circle 168 on postcard for more data

100 Years of Progress in American Metalworking Equipment

(*Continued from page* 300)

clude programming drums, "metered" screw feeds and hydraulic feeds.

It should be mentioned here that simplification and standardization of turret lathe tooling and machine setting have been developed to the point where turret lathes sometimes can be set up for profitable production of lots as small as six pieces of work. This puts turret lathes into competition with engine lathes even in tool rooms.

Thus far, this article has dealt only with those metal-working techniques involving what generally are called "cutting tools." Another highly important method—and one which within recent years has come to the fore as a production method—is metal removal by abrasion. In other words—grinding.

The universal cylindrical grinding machine dates back to a so-called "grinding lathe" built by Brown & Sharpe in the early 1860s. Originally used in the Brown & Sharpe plant to finish needle bars and foot bars of sewing machines, this machine was put on the market in 1865.

Interest in the process developed rapidly and Joseph R. Brown spent most of the last 10 years of his life redesigning this "grinding lathe" into an honest-to-goodness grinding machine. The resulting universal grinder, exhibited at the Centennial Exposition at Philadelphia in 1876—the year of Mr. Brown's death—was a complete and practical machine tool, much like its numerous descendants of the present day.

Incidentally, the Centennial Exposition in 1876—like the Crystal Palace Exhibition 25 years before—gave another big boost to the American machine tool industry. Here for the first time in history, a considerable number of machine tools were on public display. The late Worcester R. Warner, who had charge of Pratt & Whitney's exhibit, told the writer that it was one of the major factors in quick recovery of the industry from the depression of the early 1870s and its rapid expansion in subsequent decades.

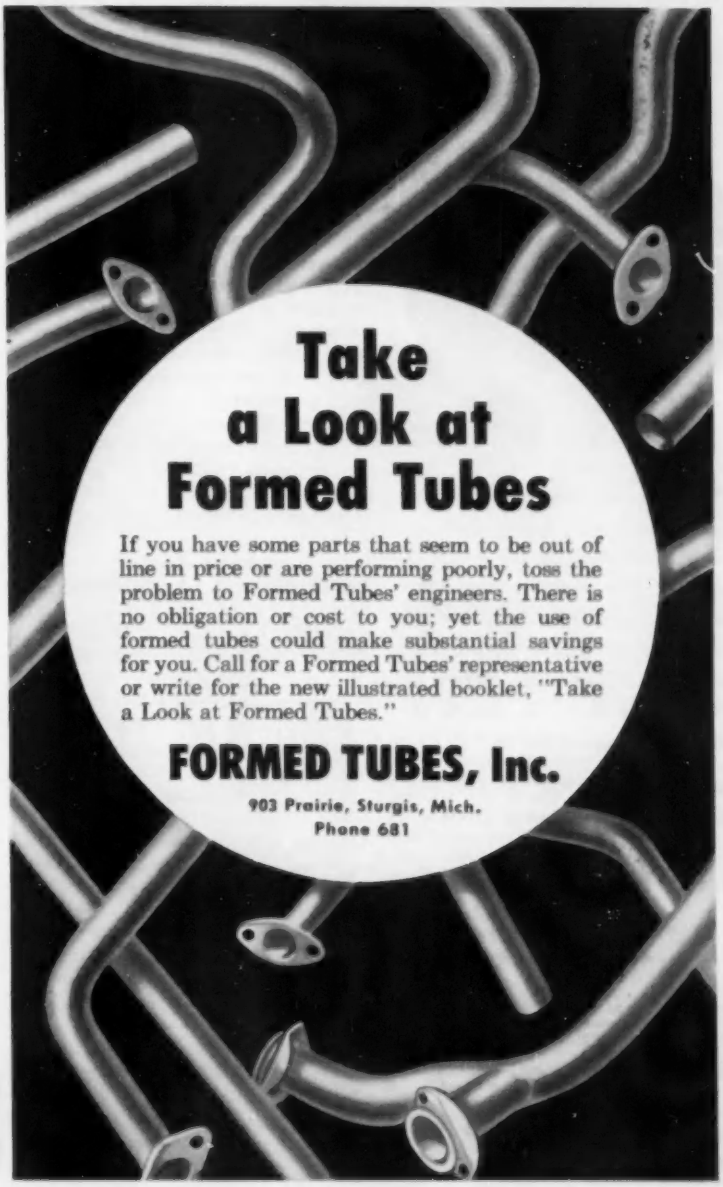
Getting back to the subject of grinding, it was almost 40 years before serious consideration was given to grinding machines—either cylindrical or "surface" types—as production machine tools. During all that time no one thought of them as "roughing out" machines. It was only

MAKING INDUSTRIAL AMERICA STRONGER

on light finishing cuts that their value was conceded.

The factor which did for grinding machines what high speed steel and more recenty cemented carbides did for other machine tools—was the invention of artificial abrasives and the technique of grading and bonding these abrasives for most effective use on a wide variety of production work.

In this review of the development of production metal-working processess over the past century, it certainly will not be fair to leave out forging and stamping. There is reason to believe that when Eli Whitney


Take
a Look at
Formed Tubes
If you have some parts that seem to be out of line in price or are performing poorly, toss the problem to Formed Tubes' engineers. There is no obligation or cost to you; yet the use of formed tubes could make substantial savings for you. Call for a Formed Tubes' representative or write for the new illustrated booklet, "Take a Look at Formed Tubes."
FORMED TUBES, Inc.
903 Prairie, Sturgis, Mich.
Phone 681

Approved for Aviation Fuel diaphragms HAARTZ-MASON Buna N on Nylon

approved under specification

Mil. C-8068

In many aviation applications where aromatic hydrocarbons are encountered, materials meeting this specification are required. HAARTZ-MASON styles meeting the specifications range from .006 inches to .050 inches thick, in sheets or molded diaphragms.

For further information and test samples write at once to—

HAARTZ-MASON, INC.
Mechanical Products Division
Watertown 72, Mass.

Send complete information on Buna N on Nylon coated fabrics .....
Send test samples of above .....
Send complete new catalog .....
To .....
Street ..... Zone .....
State .....

first conceived the idea of interchangeable manufacturing, what he actually had in mind was some method of precision forging or stamping. What he aimed to do, so he explained in a letter written in 1798, was "—to make the same parts of different guns, as the locks for example, as much like each other as the successive impressions of a copper plate engraving."

That was of course impossible at that itme, and as far as forging is concerned it still is impossible—although this ideal rapidly is being approached. Whitney actually did make die forgings by use of "jumper dies" struck by sledges on anvils.

Die forging methods rapidly were improved by other gunsmiths, Robbins & Lawrence building belt operated drop hammers and Elisha K. Root building drops raised by ratchet bars at the Colt Armory in the 1850s.

Charles E. Billings, who was a Robbins & Lawrence and Colt apprentice during the 1850s, invented the widely used board drop hammer in connection with manufacture of the Spencer-Roper repeating shot gun at Hartford in 1869. In 1872, he and Christopher M. Spencer — the same Spencer who invented the automatic screw machine — organized the Billings & Spencer Co. to build hammers and to do commercial drop forging.

The big bottleneck in the die forging business — as well as in the pressed metal business—appeared to be die sinking. As the business developed there obviously would come a day when there just would not be enough die sinkers in the world to cut all the dies required.

MAKING INDUSTRIAL AMERICA STRONGER

Before that day came, however, the machine tool industry stepped in to save the situation with its templet and form controlled die sinking machines. Typical of these were the Keller machines originally built in small sizes only, in Brooklyn, but now built by Pratt & Whitney up to sizes capable of cutting the largest automobile body dies—including those for one-piece steel tops.

This is a good example of how American machine tool builders have succeeded in building machines which make possible achievements which otherwise would be impossible because of lack of sufficient skilled manpower.

IF Silver Brazing IS PART OF YOUR PRODUCTION

You'll Need This Helpful 10 Page Reference Book

Here's a 10 page booklet that gives you all the information you need on the advantages and use of Silver Brazing Preforms.

- Gives you complete information on No Tangle-Notch Coil Rings, how they increase production, save time and labor in handling alloy.
- Helps you select the proper preform for the job. Contains charts that illustrate the type joint, recommended preform and simple ordering data.
- Gives the complete line of coined and blanked washers, and silver brazing and soldering alloys available.
- Helps you get quick, accurate alloy calculation with calculating tables for all commonly used alloys.

Send for FREE Copy Today!

LUCAS-MILHAUPT ENGINEERING CO.
5055 So. Lake Drive Cudahy, Wisc.
(Suburb of Milwaukee)

It appears to be the destiny of modern machinery to take over from human beings any chores which machines can be made to do as well or better—and above all, at less cost—than they can be done by human beings.

That is the reason for the present big wave of interest in automation,

MAKING INDUSTRIAL AMERICA STRONGER

extending beyond automatic production of parts to automatic gaging of parts and even to their automatic assembly. The interesting thing about this whole situation is that there constantly continue to be enough jobs that require human intervention and supervision, so that more and more people constantly are being employed in the mass production industries at constantly increasing rates of pay.

Of course, a lot of people are replaced and reshuffled by automation, but in the end they discover that they have been upgraded both in quality of job and in pay. Nothing would induce them to revert to the old status, once they become established in the new. Those prophets of doom who over the years have insisted that mass production equipment is destined to throw great masses of people out of employment, certainly are at a loss to explain why the result to date has been "More and better jobs for more people in the production of more and better products for more people."

• • •

French Vehicle Output Hits Record High for Six Months

French vehicle production reached the record figure of 373,256 units during the first six months of the year. The total included 219,955 passenger cars, and 80,152 trucks, while the balance consisted of buses, tractors, and special vehicles. The numerical order of importance in passenger cars was Renault, Citroen, Simca (including Ford), Peugeot, and Panhard.

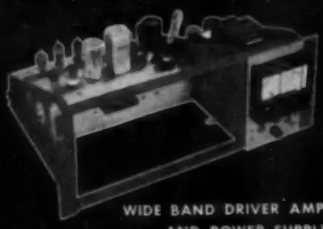
AUTOMOTIVE INDUSTRIES . . .

is your News Magazine of Automotive and Aviation

MANUFACTURING

SANBORN
OSCILLOGRAPHIC RECORDING EQUIPMENT
answers a broad range of recording problems

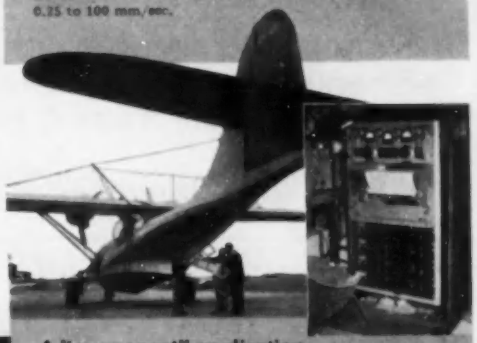
• SEPARATE COMPONENTS



WIDE BAND DRIVER AMPLIFIER AND POWER SUPPLY

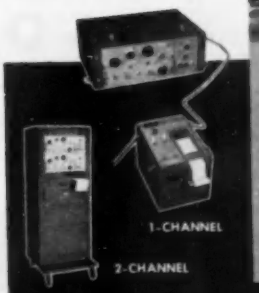
THIS amplifier (Model 150-500/700) is designed for use with low power galvanometer elements (output ±25 ma full scale into 100 ohm load), an oscilloscope and/or a panel meter, individually or simultaneously. Eleven plug in type, interchangeable Preamplifiers are available for use with it, and include: AC-DC, Carrier, DC Coupling, Servo-Monitor, Log-Audio, Low Level, Input Network, AC Wattmeter, Frequency Deviation, Stabilized DC, and an RMS Volt/Ammeter.

Other available separate components include Recorder Assemblies from 1- to 8-channels, with chart speeds from 0.25 to 100 mm/sec.

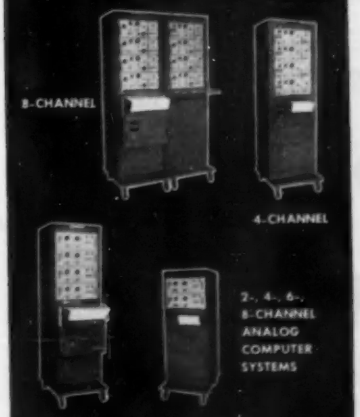


A "component" application

FOUR Model 67-300 DC Amplifiers and a Model 154-100 four-channel Recorder Assembly are integrated with other equipment aboard a "flying geophysical laboratory" by PBC Applied Research, Ltd. of Toronto to record data from dual frequency detector magnetic survey equipment and a radiation detector, plus elevation variations during flight. The simultaneous recording of all four provides valuable reference data when interpretations are being made.



• COMPLETE SYSTEMS



A Sanborn "150" system starts with a choice of an 8-, 6-, 4-, 2- or 1-channel basic assembly, to which the user adds any combination of plug-in type Preamplifiers to meet the numerous and changing recording requirements. Special 8-, 6-, 4-, and 2-channel systems are available for recording the output of analog computers, or other applications involving 1 volt/cm sensitivity. Added to this application versatility and operating flexibility of Sanborn systems are other advantages, such as inkless recording in true rectangular coordinates . . . high torque (200,000 dyne cm) galvanometer . . . time and code marking . . . numerous chart speeds.

Let Sanborn engineers help you solve your recording problems. Write for complete specifications and performance data on any Sanborn component or system.

SANBORN COMPANY

INDUSTRIAL DIVISION

CAMBRIDGE 39, MASSACHUSETTS

Multiform
STEEL RULE Dies
STEEL RULE
SINCE 1900

LET US SOLVE YOUR
DIE-CUTTING PROBLEMS
WITH RICHARDS' "TOUGH TEMPER"
STEEL RULE CUTTING DIES

HEADQUARTERS SINCE 1900
FOR DIES AND DIE MAKING
EQUIPMENT AND SUPPLIES

(Punches, Die Boards, Cutting Rule, Eject. Rubber)

FOR AUTOMOTIVE, AIRPLANE, RUBBER,
FELT, INSULATION, SEATING, CORK,
GASKET, TAR BOARD, PLASTICS, ETC.

J. A. RICHARDS CO. 903 N. PITCHER KALAMAZOO, MICH.

DYKEM
STEEL BLUE
Stops Losses
making Dies and Templates

Popular package is 8-oz. can fitted with Bakelite cap holding soft-hair brush for applying right at bench; metal surface ready for layout in a few minutes. The dark blue background makes the scribed lines show up in sharp relief, prevents metal glare. Increases efficiency and accuracy.

Write for sample on company letterhead

THE DYKEM COMPANY
2301L North 11th St. • St. Louis 6, Mo.

CUT SCRAPER TIME
END NIGHT CLEANUP & MORNING REBLUING

DYKEM HI-SPOT BLUE No. 107 is used to locate high spots when scraping bearing surfaces. As it does not dry, it remains in condition on work indefinitely, saving scraper's time. Intensely blue, smooth paste spreads thin, transfers clearly. No grit; noninjurious to metal. Uniform. Available in collapsible tubes of three sizes. Order from your supplier. Write for free sample tube on company letterhead.

THE DYKEM CO., 2301L NORTH 11TH ST., ST. LOUIS 6, MO.

HYDRAULIC SALES ENGINEERS
Experienced in Industrial Hydraulic Sales
Excellent Salaried Opportunity
Territories in Mid-West and New England
Address Replies:
Sales Manager—Hydreco Division
The New York Air Brake Company
1100 East 222nd St., Cleveland 17, Ohio

SALES MANAGER

Moderate size Wisconsin manufacturer has opportunity for Sales Manager to direct its sales activities and sales planning. Must know O.E.M. and replacement market in automotive and/or farm implement industries. Desire engineering background for specially engineered products. Company is aggressively planning to expand its markets, and this position offers excellent growth potential. Age 35-45. Salary and incentive appropriate to responsibilities. Your full reply will be treated in a confidential manner.

BOX 97, AUTOMOTIVE INDUSTRIES
5601 CHESTNUT ST., PHILADELPHIA 39, PA.

SOLENOIDS
FOR D.C. ONLY
Synchro-Start Products, Inc.
8151 N. RIDGEWAY AVE. • SKOKIE, ILL.

New RAILS Relaying
TRACKWORK of ALL KINDS
LIGHT RAILS—12# TO 60#—20'0" & 30'0"
HEAVY RAILS—60# TO 100#—30'0" & 33'8"
JOINT BARS, BOLTS, TIE PLATES, SPIKES & TOOLS, FROGS, SWITCHES, STANDARD & SPECIAL TRACKWORK.
SEND US YOUR INQUIRIES
KASLE STEEL CORPORATION

SERVING AMERICA
WITH
ENGINEERED PRODUCTS
Acme
ALUMINUM ALLOYS, INC.
232 N. FINALEY ST., DAYTON, OHIO
Tools, Engineering, Special Machinery, Patterns

BUY BONDS

MEN *in the* NEWS

(*Continued from page* 75)

Fairchild Aircraft Div., Fairchild Engine & Airplane Corp.—**J. Earl Steinhauer** has been appointed assistant to the general manager, and **Robert W. Martz** succeeds him as manager of plant operations.

Mercury Div., Ford Motor Co.—**S. A. Cornell** is now assistant general purchasing agent.

Dunlop Tire & Rubber Corp.—**Lester Hill** has been appointed tire sales manager.

Prex Corp.—**Robert W. Stoddard** has been elected chairman of the board; **John L. Sekowski**, vice-president and general manager; **Paul B. Prough**, vice-president; **Larry E. Murphy**, treasurer; **Edward W. Bettke**, comptroller; and **John P. Roche**, secretary.

Rheem Mfg. Co.—**William S. Rheem II** was elected to the board and named a vice-president.

Aluminum Industries, Inc.—**Walter J. Bemb** was elected vice-president in charge of customer relations.

Westinghouse Electric Corp.—**Charles H. Weaver** has been elected vice-president in charge of atomic power activities.

Wood & Spencer Co., Tap. Div.—**F. J. Sikorovsky** has been appointed general manager.

L.O.F. Glass Fibers Co.—**S. Austin Marquis** has been made manager of automotive sales, and **John Burman** was chosen assistant manager.

Hooker Electrochemical Co.—**Thomas H. Trimble** has been made manager of public relations.

Diesel Energy Corp.—**H. K. Breustedt** was named vice-president in charge of engineering.

Park Chemical Co.—**C. M. Compher, Jr.**, has been made sales manager.

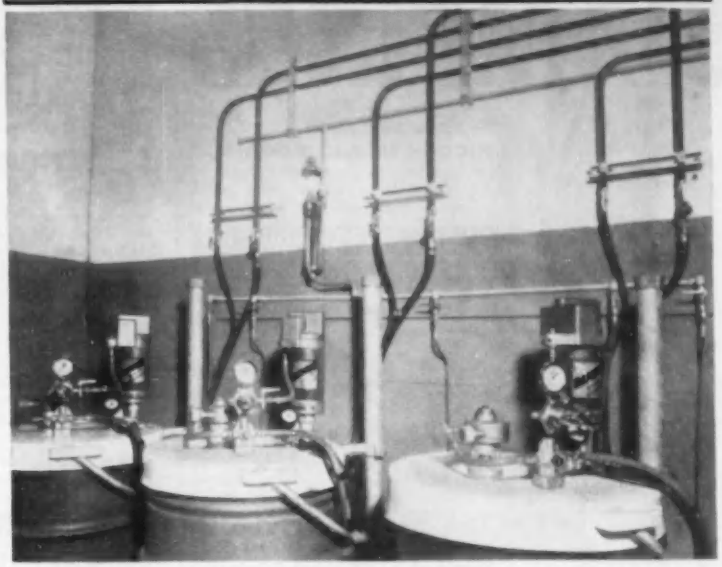
Bingham-Herbrand Corp., Herbrand Div.—**F. R. Middleton** has been named field sales manager for tools.

Harvill Corp.—**Arthur Townhill** is now director of engineering.

Northrop Aircraft, Inc.—**George H. Buchner** has been made director of contracts and spare parts.

Bristol Co.—**Ernest Nuber** has been promoted to general field sales manager.

WHAT'S NEW in material handling pumps



Finishing is faster and more uniform when you use the new Binks Material Handling Pump with your paint circulating system.

Now: a material handling pump designed specially for paint circulating systems

The new Binks Material Handling Pump introduces a new era in paint handling. This precision air-operated pump is designed and manufactured by Binks to provide a long-life, trouble-free method of pumping paints directly from the original drum through a system of piping to spray stations. Here are a few of the many ways in which this new pump can save you time and money.

Provides identical finishes at every spray station. Component parts color-match.

Reduces waste: No spillage in transferring paints. Prevents contamination.

Speeds up finishing: Pumps enough paint to supply up to 12 spray guns.

Cuts material handling time: Centralizes all material handling. No time required to transfer paint. No tanks to clean.

Minimizes maintenance: Precision parts reduce wear. Special design stops paint working up into motor. Air valve operates in pressurized housing which keeps out dust and dirt.

Reduces fire hazard: Concentrates flammable materials in one spot where they can be properly protected and controlled.

FOR FURTHER INFORMATION

on these new pumps...as well as Binks new Heavy Materials Handling Pumps, see your distributor or write direct to the address below for your free copies of Bulletins 701 and 704.

130-55

Binks
EVERYTHING FOR SPRAY PAINTING

GUNS

SPRAY BOOTHS

EXTRACTORS

FREE INSTRUCTION

Binks Manufacturing Company
3120-30 Carroll Ave., West, Chicago 12, Illinois

REPRESENTATIVES IN PRINCIPAL U. S. & CANADIAN CITIES · SEE YOUR CLASSIFIED DIRECTORY

STAMPINGS

Produced economically in our modern plant for:

AUTOMOTIVE, INDUSTRIAL EQUIPMENT, AIRCRAFT, AGRICULTURAL INDUSTRIES AND OTHERS; will boost your output at material savings.

Our production, engineering and tool-room facilities are geared to the volume usage of *your* industry.

Send us your inquiries

LANSING STAMPING COMPANY

1157 So. Penn. Ave.
Lansing 2, Michigan

Serving Industry Since 1914

Top-Drawer Service
Top-Grade Quality

CORBIN®

SELF-TIGHTENING HOSE CLAMPS

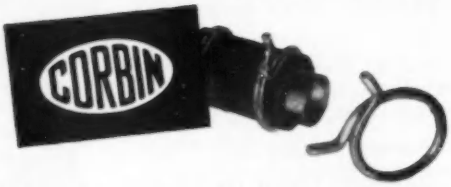
Save time, trouble, and money by using Corbin Self-Tightening Hose Clamps, the original permanent spring-tension clamp that is slipped over the connection . . . and when released automatically provides a positive, everlasting seal.

These Hose Clamps have won such widespread acceptance that virtually every automotive and appliance manufacturer in the U. S. A. is now using them.

Many users claim that when they switched from the older "screw-on" type to these self-tightening clamps, they were able to reduce labor costs by an amount almost equal to the total price they pay for Corbin-Design Clamps.

Stocked for IMMEDIATE shipment in ALL sizes to fit hoses ⅜" to 2⅝" diam.

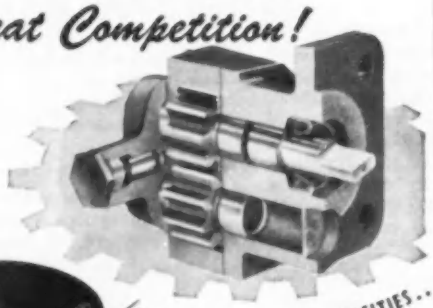
Write or phone for complete details. Corbin Hose Clamp Division, The American Hardware Corp., New Britain, Conn.



The Original Manufacturer of Self-Tightening Hose Clamps

BARNES PUMPS ARE DESIGNED

to beat Competition!



ONE SIZE-OVER 15 CAPACITIES . . NO BIGGER THAN A MAN'S FIST

- Exclusive Gear Tooth Structure
- Spring-Loaded Seal
- Self-Lubricating
- Built-in Relief Valve
- One size — Over 15 different capacities
- Port, Drive Shaft and Mounting Combinations
- Precision tooled

Each standard model of Barnes Pump is available in almost any desirable range of capacities. The capacity of the pump is determined primarily by the width of the gear face — the wider the gear the more fluid it will carry between the teeth. Each gear face size provides a range of capacity based on the operating RPM's. Variation in RPM — 50 to 8,000.

For complete details and sizes available, fill out the attached coupon, and return for complete information.

JOHN S. **BARNES** CORPORATION
309 South Water Street
Rockford, Illinois

John S. Barnes Corporation
309 South Water Street
Rockford, Illinois
Please rush full details on Barnes Hydraulic Pumps.

Name .....
Address .....
City ..... State .....
Title .....

AUTOMOTIVE INDUSTRIES

is read by general executives, production men, engineers, purchasing agents and others whose o.k. means orders for those who sell to the World's Largest Manufacturing Industry.

FOR 75 YEARS

TUTHILL
HAS SOLVED MANY EQUIPMENT
PROBLEMS REQUIRING SPECIAL
SPRINGS

Since 1880 Tuthill has specialized in designing springs to fit every specific need. Whether your spring requirements are for trucks, buses, automobiles, trailers, farm wagons or dual and triple axle heavy-duty jobs — Tuthill can meet them quickly and economically. And now, MOLYBDENUM DISULPHIDE (MoS_2) . . . the newest Tuthill extra that keeps springs from squeaking and galling, is an added Tuthill feature that distinguishes this famous line.

Whatever your spring requirements may be — see Tuthill first!

TUTHILL SPRING CO.
760 West Polk Street Chicago 7, Illinois

use these
GRIPCO CLINCH NUTS
with the exclusive
hex on hex
feature

for "fixed" fastenings for "hard-to-reach" or blind assemblies. They wear longer, hold tighter, give greater customer satisfaction.

See how leading appliance manufacturers get lower cost fasteners into inaccessible places.

Gripco Clinch Nuts can be either clinched solid for a rigid application or staked in with a six point staking punch to give a floating effect. This floating effect takes care of misalignment and makes the application of the bolt easier. Gripco clinch nuts can be clinched or staked with stationary or portable hydraulic or air equipment. Details on request. Write for samples and data sheet.

Typical Applications

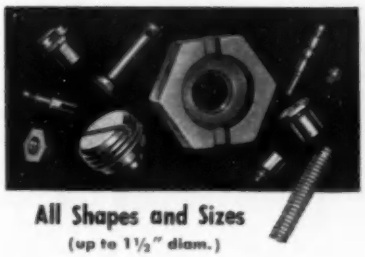
Automatic Washer for leg leveling and crating on all appliances

Tractor Seats

Power Lawn Mowers

Automobile Frames

GRIP NUT COMPANY
311-P S. Michigan Avenue, Chicago 4, Illinois
113



All Shapes and Sizes
(up to 1½" diam.)

AUTOMATIC SCREW MACHINE

Superior PRECISION Parts

We specialize in difficult, extra-exact work — supply AQL certifications. Member of American Society for Quality Control. Now serving leading national manufacturers including Solar Aircraft Company, Collins Radio Company.

Submit blueprint for bid or address inquiry to

INLAND AUTOMATIC, INC.
(SUBSIDIARY)
INLAND MFG. CO., Omaha 8, Nebr.
1108 Jackson Street Phone HArney 1108
Dept. AI-9

G&O
Radiators
40th Year

ENGINE COOLING RADIATORS
•
HEATERS
•
OIL COOLERS
•

THE G & O MANUFACTURING CO.
NEW HAVEN CONNECTICUT

Index to Advertisers

This Advertisers' Index is published as a convenience, and not as part of the advertising contract. Every care will be taken to index correctly. No allowance will be made for errors or failure to insert

A

Acme Aluminum Alloys, Inc. 318
Acme Industrial Co. 284
Aetna Ball & Roller Bearing Co. .. 251
Aetna Plywood & Veneer Co. 268
Aircraft & Marine Products, Inc. .. 289
Ajax Mfg. Co. 197
Allison Engine Div. 269
American Broach & Machine Co. 196
American Steel & Wire Div. .. 272-273
American Steel Foundries 178
Anchor Steel & Conveyor Co. 222
Armstrong Cork Co. 7
Aro Equipment Corp. 40
Automatic Spring Coiling Co. 300

B

Baird Machine Co. 5
Baker Bros., Inc. 206-207
Baldwin-Lima-Hamilton Corp. 175
Barber-Colman Co. 164-165
Barnes Co., W. F. & John 162-163
Barnes Corp., John S. 320
Barnes Drill Co. 160-161
Bellows Co. 259
Bendix Aviation Corp.
Bendix Products Div. 62
Bendix-Westinghouse Automotive
Air Brake Co. 50
Besly-Welles Corp. 173
Bethlehem Steel Co. 25
Binks Mfg. Co. 319
Bliss Co., E. W. 186-187
Bliss & Laughlin, Inc. 97
Blood Bros. Machine Div. 301
Box 97 318
Brown Corp. 282
Buell Mfg. Co. 98
Bullard Co. 78
Burgess-Norton Mfg. Co. 94-95

C

Century Gas Equipment Co. 281
Chambersburg Engineering Co. 106-107
Chemical Products Corp. 324
Chicago Rivet & Machine Co. 223
Chicago Screw Co. 258
Chrysler Corp. (Amplex Div.) 257
Cincinnati Milling Machine Co. 64
Cincinnati Shaper Co. 38-39-262-263
Clearing Machine Corp. 176
Cleveland Punch & Shear Wks. Co. 29
Cleveland Worm & Gear Co. 4
Columbia-Geneva Steel Div. .. 272-273
Copperweld Steel Co. Steel Div. .. 247
Corbin Hose Clamp Div. 320
Cotta Transmission Co. 1
Crane Packing Co. 265
Cross Co. 12

D

Danly Machine Specialties, Inc.
..... 18-19-105
Davis & Thompson Co. 191
Denison Engineering Co. 56-57
Detroit Steel Products Co. 275
Dudco Div. New York Air Brake Co. 221
du Pont de Nemours & Co., Inc.
..... 279-280
Dykem Co. 318

E

Eaton Mfg. Co.
Dynamatic Div. 101
Pump Div. 108
Valve Div. 104
Elmes Engineering Div. 178
Enjay Co. 303
Ex-Cell-O Corp. 201

F

Federal Machine & Welder Co. 310
Fellows Gear Shaper Co. 58-59
Foote-Burt Co. 190
Formed Tubes, Inc. 315

G

G & O Mfg. Co. 321
General Electric Co. 14-54-55
Gisholt Machine Co. 188
Goodrich Chemical Co., B. F. 17
Goodyear Aircraft Corp. 241
Greenlee Bros. & Co. 168
Gridley Machine Div. 32-33
Grip Nut Co. 321
Gunite Foundries 295

H

Haartz-Mason, Inc. 316
Handy & Harman 276
Hansen Mfg. Co. 288
Hartford Special Machinery Co. .. 252
Harvey Aluminum Sales, Inc. 267
Hassall Inc., John 311
Heald Machine Co. 34-35
Hercules Motors Corp. 309
Hill Acme Co. 48
Howell Electric Motors Co. 274
Hyatt Bearings Div. 49
Hydreco Div. New York Air Brake
Co. 220-318

I

Imperial Brass Mfg. Co. 45
Industrial Filtration Co. 15
Inland Mfg. Co. 321
Inland Mfg. Div. 255
International Nickel Co. 2

J

Jones & Laughlin Steel Corp. 253
Jones Motrola Corp. 314

K

Kasle Steel Corp. 318
Kearney & Trecker Corp. 202-203
Keller Tool Div. 224
Kempsmith Machine Co. 228
Kent-Owens Machine Co. 174
Kingsbury Machine Tool Corp. 185

Index to Advertisers

—continued

L

Lansing Stamping Co. ... 320
La Salle Steel Co. ... 93
La Salle Tool, Inc. ... 100
Leland-Gifford ... 200
Le Blond Machine Tool Co., R. K. 194-195
Lipe Rollway Corp. ... 270
Littell Machine Co., F. J. ... 312
Lodge & Shipley Co. ... 184
Lucas Machine Div. ... 32-33
Lucas-Milhaupt Engineering Co. ... 316

M

McKay Machine Co. ... 277
M. B. I. Export & Import, Ltd. ... 30-31
Mahon Co., R. C. ... 285
Mallory & Co., P. R. ... 28
Marman Products Co., Inc. ... 293
Marvel Engineering Co. ... 313
Mattison Machine Works ... 172
Mechanics Universal Joint Div. ... 189
Michigan Tool Co. ... 304
Micromatic Hone Corp. ... 177
Miller Fluid Power Co. ... 219
Modern Industrial Engineering Co. 182-183
Moline Tool Co. ... 302
Motch & Merryweather Machinery Co. ... 179

N

National Acme Co. ... 112
National Automatic Tool Co. ... 192-193
National Broach & Machine Co. ... 180
National Machine Products Co. ... 324
National Machinery Co. ... 181
National Motor Bearing Co., Inc. ... 53
National Screw & Mfg. Co. ... 76
National Standard Co. ... 20
New Britain Machine Co. ... 32-33
New Departure Div. ... Back Cover
New York Air Brake Co. ... 220-221-318
Niagara Machine & Tool Wks. ... 46-47
Nickey Bros., Inc. ... 268
Norton Co. ... 26-27
Norgren Co., C. A. ... 261

O

Ohio Crankshaft Co. ... 297
Ohio Seamless Tube Div., Copperweld Steel Co. ... 208
Olsen Testing Machine Co., Tinius ... 296
Orchard Paper Co. ... 308
Ortman-Miller Machine Co. ... 109
Osborn Mfg. Co. ... 226

P

Pangborn Corp. ... 52
Perfect Circle Corp. ... 243
Pratt & Whitney Div. ... 9

R

Rathborne, Hair & Ridgway Box Co. ... 256
Raybestos-Manhattan, Inc., Equipment Sales Div. ... 60-61
Reliance Electric & Engineering Co. ... 287
Reynolds Aluminum Fabricating Service ... 290-291
Richards Co., J. A. ... 318
Richardson Co. ... 102
Rockford Clutch Div. ... 169
Rockford Machine Tool Co. ... 166-167
Roto-Finish Co. ... 264

S

S-P Mfg. Corp. ... 266
Sahlin Engineering Co., Inc. ... 51
Sanborn Co. ... 317
Schwitzer Cummins Co. ... 239
Seneca Falls Machine Co. ... 41-44
Sesco, Inc. ... 314
Sheffield Corp. ... 204
Snyder Tool & Engineering Co. ... 198-199
Standard Oil Co. (Ind.) ... 2nd Cover
Standard Pressed Steel Co. ... 36-37
Standard Tube Co. ... 254
Star-Kimble Motor Div. ... 299
Sterling Aluminum Prod., Inc. ... 249
Stuart Oil Co., D. A. ... 110
Sun Oil Co. ... 8
Sundstrand Machine Tool Co. ... 170-171
Synchro Start Products, Inc. ... 318

T

Taylor Dynamometer & Machine Co. ... 292
Taylor-Winfield Corp. ... 278
Tennessee Coal & Iron Div. ... 272-273
Texas Co. ... 74
Thompson Products, Inc. ... 10
Thomson Industries, Inc. ... 260
Timken Roller Bearing Co. ... 283
Tomkins Johnson Co. ... 286
Torrington Co. ... 244
Tourek Mfg. Co., J. J. ... 103
Towmotor Corp. ... 294
Tuthill Pump Co. ... 298
Tuthill Spring Co. ... 321
Twin Disc Clutch Co. ... 225

U

United States Rubber Co. ... 205
United States Steel Corp. ... 272-273

V

Verson Allsteel Press Co. ... 99
Vickers, Inc. ... 21-24

W

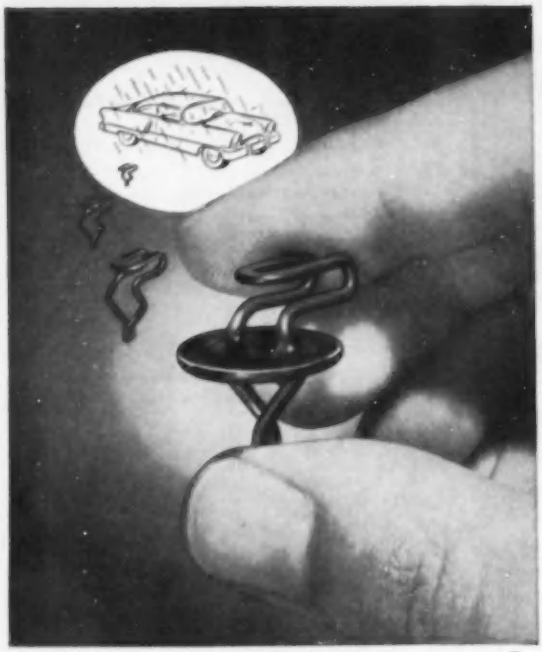
Waldes Kohinoor, Inc. ... 13
Wean Equipment Corp. ... 271
Webb Co., Jervis B. ... 210
Webber Gage Co. ... 306
Western Felt Wks. ... 96
Wheel Trueing Tool Co. ... 307
White Industrial Div., S. S. ... 305
Wyman Gordon Co. ... 16

Y

Yale & Towne Mfg. Co. ... 11
Young Radiator Co. ... 6

Z

Zagar Tool Co. ... 233
Zephyr Mfg. Co. ... 250
Zollner Machine Works ... 3rd Cover



chem·o·sol®

solves another problem by improving

DOOR TRIM PANEL CLIPS

The easy molding properties of **chem-o-sol** have enabled one of the "Big Three" to eliminate a costly hand operation — at the same time improving the product.

Problem was to gasket holes to prevent leakage of rain water through clip holes in door trim panels and into upholstery. The conventional hand operation of applying sealant material had proved time-consuming and unsatisfactory. The search for improved techniques showed **chem-o-sol** to be the perfect material — because of its property of ready moldability to the clip, to provide an integral gasketing unit.

This manageable liquid vinyl dispersion was especially formulated for production line application. Easily converted into a tough, flexible solid by controlled heat at moderate temperatures, **chem-o-sol** saved the manufacturer and customer time and money in this low cost molding operation.

Write to us for information on other applications of **chem-o-sol** by dipping, spraying, slush molding, and die wiping. Learn how our individual formulations of **chem-o-sol** have improved other products — created new ones.

Information courtesy of Mattatuck Mfg. Co., Waterbury, Conn.

Send for Bulletin 141.

Chemical Products CORPORATION

KING PHILIP ROAD • EAST PROVIDENCE R I

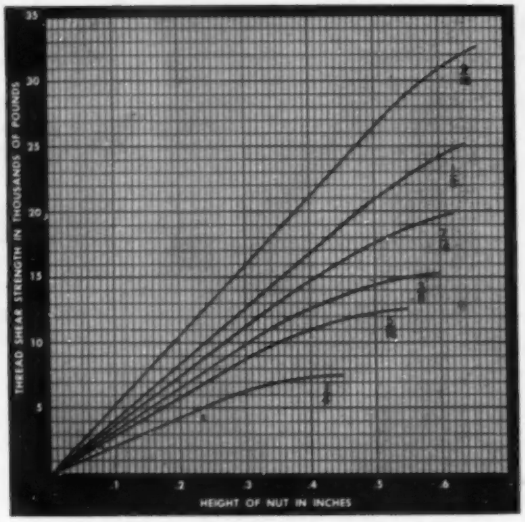


Figure 2

24 page **engineering data...** *Section*

Figure 2, Height vs. Shear Strength, on page 5 in our new Engineering Data Section of our catalog, is just one of the several factors that are discussed on pages 3, 4, 5 and 6 for applications of finished hexagon nuts (fine and coarse threads) where highly stressed bolts of special material are required. . . . Fourteen topics, concerning the technique in the manufacture and the proper installation of our product are covered in this brochure — requests for this literature will be handled promptly.

NATIONAL MACHINE PRODUCTS COMPANY

Manufacturer of Standard and Special 12 Point and Hexagon Nuts . . . "Huglock" and "Marsden" locknuts.

44233 Utica Rd., UTICA, Michigan

Sensational Piston Performance

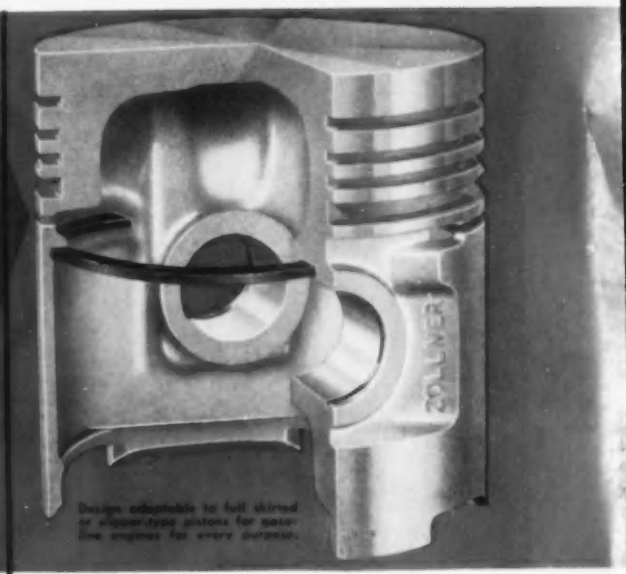
UNIFORM CLEARANCE AT ALL TEMPERATURES

STEEL TENSION MEMBER

Anchored only at pin bosses and cast in positive contact with I. D. of piston skirt

Controls Clearance Automatically

ZOLLNER CLEAR-O-MATIC PISTONS



Design adaptable to full skirted or slipper-type pistons for gasoline engines for every purpose.

Now, pistons may be fitted to closer clearances than ever before possible. The sensational development of CLEAR-O-MATIC Pistons by Zollner engineers *reduces required clearance to less than .001 with constant uniformity of skirt bearing over the entire temperature range.* Performance results are spectacular. Engines run quietly with no cold slap. Friction is reduced without loss of durability or heat conductivity. There is no danger of scuffing or seizing. The Zollner designed steel tension member incorporates in the aluminum piston the same effective expansion as the ferrous cylinder itself. We urge your immediate test of these sensational advantages for your engine.

UNIFORM EFFECTIVE SKIRT CLEARANCE AT ALL TEMPERATURES

1. Clearance maintained uniformly at all coolant temperatures from 20° below zero to 200° F.
2. Effective expansion identical with ferrous cylinder.
3. Steel tension member, with same effective expansion as cylinder, maintains uniform skirt clearance through entire temperature range.
4. Normal diametric clearance usually less than .001 with uniform skirt bearing.
5. Durability and conductivity comparable to heavy duty design.

ZOLLNER PISTONS

THE ORIGINAL EQUIPMENT PISTONS

ZOLLNER

- **ADVANCED ENGINEERING**
- **PRECISION PRODUCTION**

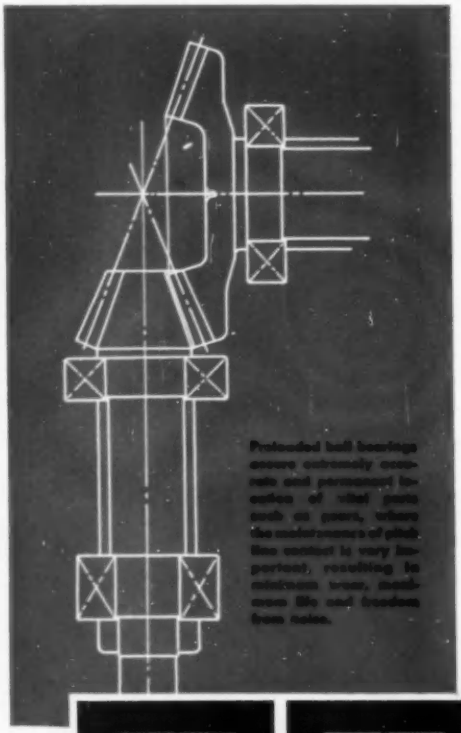
in cooperation with engine builders

ZOLLNER MACHINE WORKS • Fort Wayne, Indiana

FACTS

about

NEW DEPARTURE
BALL BEARINGS



Preloaded ball bearings assure extremely accurate and permanent location of shaft parts such as gears, where the maintenance of pitch line contact is very important, resulting in minimum wear, maximum life and freedom from noise.

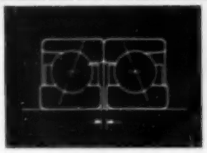
How Preloading Pays Off in Accuracy!

New Departure pioneered preloading to give you a new measure of machine accuracy! This accuracy, due to increased bearing rigidity, pays off in high-precision machines, where the slightest deflection caused by work loads on moving parts can be crucial to the ultimate performance of the machine.

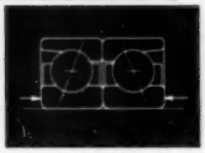
By placing a predetermined internal load on the bearing, either at the time of manufacture or at installation, deflection due to the work load is greatly reduced. This means not only that machine accuracy is greatly improved, but that the ball bearing characteristics of low torque operation and long life are fully retained.

If you are seeking a solution to your bearing problem, call on New Departure for the answer. You will benefit from more than 50 years' experience in bearing design, testing and manufacture.

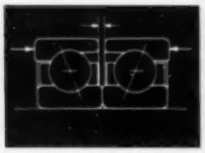
Send for Booklet BA-10 on ball bearing application



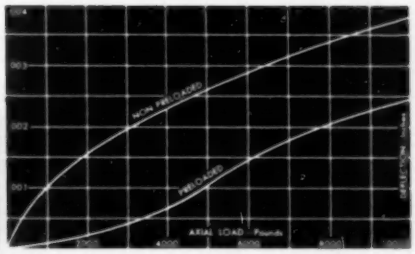
Preload is predetermined, then accurately obtained by grinding Duplex bearing faces so that an exact and fixed compression will take place when mounted.



A Duplex bearing, in effect, becomes a preloaded double-row bearing capable of holding parts within close limits, both radially and axially.



Duplex bearings may be mounted in several different ways to suit load conditions. In each case, extra rigidity of shaft centering is obtained by preloading.

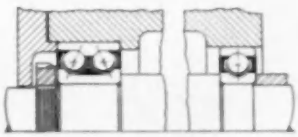


The benefits of preloading can be seen from this deflection curve. The double-row ball bearing referred to here is the most rigid type of unit bearing made to resist loads from any direction.

Typical Application of New Departure Preloaded Ball Bearings

The extreme resistance to deflection and the freedom from wear offered by the New Departure double-row bearing make it a favorite wherever exact location of parts under combined loads must be assured not only initially, but throughout long usage.

In this typical application the double row, solidly supported against suitable housing and shaft shoulders and with a "floated" single row at the other end, provides one of the best general-duty mountings where considerable thrust is present.



NEW DEPARTURE • DIVISION OF GENERAL MOTORS • BRISTOL, CONN.